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## NEWS IN BRIEF

## NCR two-day strike threat

THREATENED strike action by NCR service engineers on Monday and Tuesday this week (CW, February 14) in support of a pay claim was called off after the company made two revised pay offers.

The strike was postponed by ASTMS representatives so that the 750 engineers could be balanced on whether to accept one of the offers, which would give a 10% across-the-board increase compared to the previous 10% offer.

## Theatre bookings

A feasibility study is being carried out at the National Theatre to see how the box office can best be computerised. With three theatres playing in repertory to let sales be computerised and labour intensive, the aim is to make them as efficient as airline bookings.

## 500th printer

PERIPHERAL wholesaler X-Dat of Slough has delivered its 500th printer. And the company, formed in January 1978, expects to deliver its 1,000th printer by May.

## BCS AGM move

THE Council of the British Computer Society is to move away from London for its annual meeting and for the 1980 annual meeting which is to take place in the Council House, Birmingham on October 9, so that more members will be able to attend.

## COMPUTER WEEKLY

## European bureaux bid for Lowndes-Ajax

TWO large Continental bureaux have confirmed that they are bidding for the UK bureau Lowndes-Ajax, which is being sold by the Hill Samuel group.

The two are Centre Informatique Générale of Brussels and the largest European-owned bureau group, the French company Générale de Service Informatique.

CIG in Brussels said it was interested in taking over Lowndes-Ajax as part of its international expansion plans. In addition to its big IBM-based centre in Brussels, CIG

also owns bureau operations in Spain, Portugal, Brazil and Argentina and is soon to acquire a bureau in Mexico. CIG's turnover stands at \$40 million a year.

GSI of France, which is the biggest European-owned bureau group, already has a firm foothold in the UK through its ownership of the former GRC operation.

GSI's management in the UK is keen on the takeover. GSI already owns several big IBM-based bureau centres around Europe. Hill Samuel was not prepared to comment

on its reasons for wanting to sell Lowndes-Ajax, but its decision could have been affected, at least partly, by the impending departure of Peter Merrick, who has been managing director of Lowndes-Ajax for the last 11 years and who is now leaving to set up his own firm (CW, December 20/27, 1979).

GSI and CIG are both owned by major organisations. GSI is part of the French electrical giant, CGE, while CIG is owned by the big Belgian bank, Société Générale.

## £2.5m study centre to investigate effect of technical change

A RESEARCH and study centre for investigating the effect of technical change on society is to be set up by the Leverhulme Trust in conjunction with the Science and Social Science Research Councils.

About £2.5 million is to be devoted over the next five years to support 20 researchers who will look into the use of natural resources, how the labour force adapts to change, and the trade-off between economic advance and social loss.

Chairman of the governing body of the Centre for the Analysis of Technical Change, as it will be called, is to be Sir Michael Swann FRS, a zoologist who is

also chairman of the governors of the BBC. Other staff have not yet been chosen, nor has the location of the Centre.

The Leverhulme Trust, a charitable offshoot of Unilever, is committing £1.5 million to the project, and each of the research councils will pay an additional £525,000. At the end of five years there will be a review before another five years' funds are committed.

The Centre's work is intended to boost the economy, promote the application of technical developments, and help the research councils choose their policies. "A continuing theme," according to the trust, "will be



Swann

the way in which the obstacles to the creation and sensible use of wealth can be removed.

Decision making and the formation of expectations will also be studied.

Manufacturing technology will also be looked into, how it can be advanced and whether a substantial domestic capacity in certain basic industries should be maintained.

The Centre will produce publications and run seminars and conferences to involve people from outside in its work. Most of the staff will probably be on secondment from industry, universities, and government departments.

## Triumph-Adler home computer bid

● From front page  
costs £8,500 and has applications software available, is being launched this week.

Michael Davies, managing director of Adler Business Systems, Triumph-Adler's UK subsidiary, said the personal computers would be sold through the company's existing network of dealers, distributors and shops.

"In the UK we have 50% of the typewriter market, gained from strong indirect marketing

through almost 1,400 dealers and distributors," he said. "It makes sense for us to use these channels for the Alphatron."

Davies said Volkswagen's backing was not only allowing Triumph-Adler to move into the personal computing and distributed processing markets, but also enabling it to become a supplier to original equipment manufacturers. It was already

selling printers in this market and would expand this operation.

"Our main concern, however, will continue to be to consolidate in the end-user market," he said. "We will continue to grow in the small business market." As if to prove this point, the company is launching a magnetic ledger card system, TABS 20, this week.

## Receiver in at Gamma

● From front page

back Gamma's holding from the receiver and have already changed the company's name back to the original Fars Computer Services. Fars main business is financial packages for mainframes.

Also unaffected by the crash are the line-up of firms in which the Gamma Group had minority holdings until they bought themselves out last year. These firms are Karlin Computer Systems, formerly Gamma Computer Products, General Terminals and Systems, which used to be called Gamma Telecommunications Systems, and GBS Interactive Systems, formerly Gimmim Business Systems (London).

Another operation that will be

affected by the crash is the Gamma Computer Corp, the US subsidiary set up last year in an ambitious attempt by Gamma to take a share of the US market for DEC-based systems (CW, May 24, 1979). Gamma's confidence was boosted by the fact that its own turnover of well over £3 million a year was a lot higher than that of most DEC systems houses in the US.

Top people at Gamma affected by the crash include managing director and founder Dr George Coggan, who had a 25% share in the company; and chairman Sir Denning Pearson, who was chairman of Rolla-Royce until it was nationalised in 1971.

Company News Comment — Page 15.

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## Takeover of Decca puts Racal off Ferrari

RACAL'S takeover of all electronics manufacturer Decca last week has thwarted GEC, who also made it less likely that Racal will be able or willing to buy Ferrari from the government.

City analysts feel that following the purchase of Decca which is now "all over bar shouting", Racal will have enough on its hands getting Decca back on its feet, even if it will also be short of the necessary cash.

Much hinges on the performance of the stock market in the next few weeks, when Decca shareholders decide whether to take Racal's offer of shares to take the shares, but if the price falls the cash may seem more attractive.

A Racal spokesman confirmed the view that his company will be fully occupied for the immediate future with completing the Decca takeover.

The completion of the National Enterprise Board to sell changes in the Commons to the Industry Bill, but there is plenty of pressure for the share take place.

Racal's offer for Decca is about £103 million.

## £300 essay prize

"THE practical implications of office automation" is the subject of this year's prize essay competition run by the Institute of Data Processing Management and Langton Information Systems. A first prize of £300 will be awarded for the best essay of between 2,000 and 3,000 words from anyone working in industry, commerce, education, or government.

Will the impact of electronic systems in offices really be as great as has been forecast, or will office operations in the future be not all that dissimilar from those today? These are the questions that the organisers intend the competition to deal with.

Closing date for entries is May 19. Entry forms can be obtained from the IDPM at 12-13 Henrietta St, London WC2E 8NU.

## GTL appointment

TONY DAVIES, founder of the test equipment company Membrain, has been appointed executive deputy chairman of the minimaker Computer Technology. Membrain was acquired by Schlumberger in 1977 and Davies' last position was that of general manager for Schlumberger's UK electronic investment.

## COMMA COMPUTERS LIMITED GIFTS FOR 1980

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## Briefing

## DEC links to SNA hosts

DIGITAL Equipment computers will now link to IBM Systems Network Architecture host machines following the announcement by DEC of Phase III of its DECnet network software.

This means IBM users will have another alternative to IBM's SNA distributed system.

DEC is also offering to make DECnet compatible with X25 public packet switching protocols.

Full details: page nine.

## Fight for factory

HAVING lost out to Bristol in the public fight to win the first manufacturing plant to be built by Inmos, Northern group Labors MP are now after the second factory planned by the company. But there is still no news of when, or even if, the industry Secretary Sir Keith Joseph will approve the second tranche of £25 million needed to build the Bristol plant. The MPs are to meet representatives of the company's backers, the National Enterprise Board, next week.

Thorn made a detailed study of General Automation last year and both were interested in acquiring another US mini-maker. Mulcomp of Florida, before Modcomp finally assured its future through an agreement with AEG-Telefunken of West Germany.

If Burroughs were to acquire General Automation it would be embarrassing for Swift, the international banking funds transfer network consortium, since three suppliers were approved for the terminal Swift Interface Device, SIDs — Burroughs, General Automation and Singer.

When Singer pulled out of the computer business, its system lost almost all credibility with the banks, and nearly all the Swift Interface business has gone either to Burroughs or General Automation. If one acquired the other it would leave only one effective approved supplier with two competing products.

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## Braille sale

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## Hanover launch

A REPLACEMENT for the Univac 80/30 is expected to be launched in time for the launch fair in April. The machine will run under an enhanced but compatible version of the OS/3 operating system with major extensions for interactive working, and will have a dual bus architecture.

## Halifax cash dispenser threat to banks

IN the fiercest challenge yet to the big clearing banks, the Halifax Building Society is running a pilot scheme in which customers at six Yorkshire branches will be offered cash dispenser facilities on accounts bearing interest at the standard 10% rate.

The pilot, exclusively revealed here last year (CW, July 12, 1979), involves installation of IBM 3624 lobby cash dispensers at two branches in Sheffield, one in Huddersfield and two in Bradford. The experiment was begun with the earlier 3014 device

installed at head office in Halifax.

Staff and retired members of staff are entitled to deposit cheque accounts, which offer chequebook facilities as well as the cash card, and pay interest at 1%. But members of the public will be able to withdraw up to £200 a day from cash dispensers paying the ruling building society interest rate. The dispensers will be available in normal opening hours, including Saturdays.

The pilot is to run for 12 months before firm decisions on expansion are taken. The Halifax, claimed to be the biggest building society in the world, runs a loan data processing installation consisting of an Amdek 470V/7 and an IBM 370/155 equipped with a built-on DAT box which provides the paging facilities required for virtual operation.

The society has converted from MFT and OS/VS-1 to MVS. It is also installing Philips PTS 8000 cashier position and back-office terminals in 400 branches under a £10 million contract.

## UK firms in race to buy GA

UK COMPANIES are among the unnamed suitors of California minicomputer manufacturer General Automation. But a US firm, Burroughs, is the first to declare an interest in acquiring the company.

Thorn and GEC are possible suitors, but neither company comments on acquisition rumours before making a formal announcement.

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## Downtime

by Chad

### Take the drudgery out of picketing...

WATCHING the flying steel pickets shiver through the early morning hours, I suddenly had the thought that there is an obvious growth area for British robotics. These pickets are on the job for far longer hours than when they are at work. Why not save them all the drudgery and have a microprocessor-driven picket?

Audio tape loops could enable them to shout out their slogans endlessly with no problems of hoarseness. With a simple cam follower device the machines could shake their placards up and down.

We could also have microprocessor-driven pickets, freeing all those hundreds of bobbies to go and hunt down computer criminals. During slack periods the micros would run AI programs to try and figure out Lord Denning's judgments.

This brings to mind the idea I first heard from industry pundit Adrian Norman, that the solution to the unemployment problem is a vast expansion of the quaternary sector of the economy. After the farming, manufacturing, and service



"This one's approved by Dr. Boyson."

## In place of jargon

I AM always poo-pooing the idea of computers taking over, but after this news from the West Midlands I may have to eat my words.

Words are what it is all about, as it seems a special language has been devised for use by Birmingham City Council staff to make things

easy for the computer. A set of words has been dreamed up for dealing with planning applications, and each has to be eight characters long, to fit in with someone's idea of what computers can and cannot handle.

In "plan-talk", properties are described by a combination of words such as "uglyfront" (fairly clear what that means), "prayuses" (religious buildings), "smelly-d" (Indian

restaurants, sewage works), "keepsop" (the retaining of shopping facilities), "facemats" (facing materials), and "treegard" (protecting trees).

This is supposed to replace "the cumbersome bureaucratic jargon of the past," would you believe.

As if this weren't bad enough, it is claimed that this perverse computer distinguishes numerical data by putting the word "number" in front of it. Some programmer has forgotten to remove the word on output, and this explains strange council notices that have been appearing such as a planning application for "Number fifty greyhound resting kennels."

## GILB'S MYTHODOLOGY

### N<sup>2</sup> charting and automated design methods: a reader's view

A LOT of readers were interested in my description of TRW Systems' N<sup>2</sup> charting method (CW, December 6, 1979). Among the correspondence was a letter from P. S. T. Buckfield, who is data facilities engineer in Rolls-Royce's Aero Division.

He wrote, "Your note on the N<sup>2</sup> chart reminded me that I worked on a system for matrix representation of data relationships nearly a decade ago."

"What I devised was a scheme not merely for tabular display of system relationships, starting from data requirements, but for a design tool which conceivably could lead to automatic programming of a system from a statement of requirements."

Very briefly, any system is describable in terms of owner/member relationships between its parts. If a matrix is formed by assigning the Y coordinate as the set of owning parts and the X coordinate as the set of member parts (which can be identical with the owner parts), then the elements of the matrix would be '1' to indicate the presence of an owner/member relationship between two items in the Y and X coordinates respectively. Absence of a '1' (or a zero) implies lack of such relationship.

"Thus, for any particular application, only the relevant relationships or links are entered."

"Now, if the items along the Y and X coordinates are names of data items, then we may consider a database covering a variety of user applications and containing all the associated relationships. In order to build up such a database, each application can be expressed in terms of a sub-matrix applying to that application only. If all the sub-matrices are then summed by matrix addition, the sum matrix will contain all the relationships relevant to all the applications so far loaded, and the value in each element of the database matrix will indicate the number of application occurrences of a relationship."

"The matrix elements may be further incremented by use of a weighting factor depending on such variables as frequency of occurrence, priority or importance of the relationship, etc."

"A complex system may be built up from a set of simpler systems in this way. The method

offers other virtues, such as the ability to deduce the structural form of a system. For example, if all the links are on a diagonal, then a simple string structure is indicated. Links on a particular row indicate a single rank of elements on the same level. Multiple entries in a row indicate branching (a tree structure). Multiple column entries indicate a multiple parent. Both multiple row and multiple column entries including common elements indicate a network structure. If a link appears below a principal diagonal, then a ring is present.

"The principle lends itself to expression of relationships at any level — basic element, segments, files, databases, or any type of object — data items, programs, systems, in any meaningful owner/member relationship."

"Calculation and manipulation may be performed on matrices to yield other-useful results."

"Given the effort for development, it is possible that much of system design and construction could be automated. An ideal language for this would be APL, with its capability to handle matrices."

"If suitable report generators were designed, the system would comprise a valuable data dictionary, which would be built as a by-product of system design."

Buckfield does not mention the many attempts that have been made to create automatic design systems.

Let me mention a few: the most long-standing project still alive might be Professor Daniel

Teichrow's ISOOS project at the University of Michigan (see his paper in Infotech report on Software Reliability).

TRW Systems has a number of automated system design aids at several levels of detail: for example, RSL-Datu Descriptions (Requirements Specification Language) in the TRW internal publication, A Requirements Engineering Methodology for Real Time Processing Requirements. The fact that even TRW, with its effort and investment in this sector, does not have full design automation, is a measure of the difficulty of the task.

On my desk this week I got an invitation from Christer Jaderlund to see a presentation of Cogitor, a form of automatic system design. I know enough of Jaderlund's previous work in this area to treat it with respect. Cogitor is described as "an intellectual robot which supports thinking and problem solution in all phases of system development. It interprets and translates system specifications in a natural language into system solutions in system-matrix format. The solutions are tested automatically. Finally the solutions can be manually or automatically translated into a program — for example Cobol."

Cogitor is based on a Zilog microprocessor and an ISC colour VDU. Those who want more details might start by writing to Systematik AB, Box 3369, S 163 03 Spanga, Sweden. Otherwise, I'll try to share more details, as I get them, with CW readers.

This list is not exhaustive but



Tom Gilb is an independent consultant, lecturer and author on computing topics.

any means, but it should serve document the point that existing automated design projects before deciding what can do to further the state of art.

As readers of my column might suspect, I have my pet ideas on automated system design.

My basic thesis is that something like an automated version of the Design by Objectives tools, which I described a number of columns in 1978, is the main deficiency of present tools: they cannot do in attribute specifications (reliability, portability and like) and translate these high-level design techniques specifications. Too much what exists is really either generators, high-level practical languages or structured-processing systems.

These are not truly design aids. Anyway, and ideas are working in an automated form on my App would be highly sceptical at their practical validity. I only hope that the act of trying to automate them will make clear to me that I don't know enough about the process. Perhaps I will learn more.

Perhaps there are examples software design automatic which some readers would like to share with us either in letter or article form. Be assured, we are waiting to hear from you. One of the functions of computer Press is to inform what exists so that we can reinventing the wheel.

## Retrieval package devised by UK Atomic Energy Authority

AN information retrieval package aimed at combining the facilities of database management systems with text search systems has been devised by the UK Atomic Energy Authority, in conjunction with Turnkey Software of Amersham.

Called Lexiboss, the package runs on the Digital Equipment Corporation PDP-11 and can handle structured, interrelated data, numerical information, and large volumes of free text.

Lexiboss was developed at the UKAEA

National Centre of Systems Reliability originally for handling reports and legislation. It grew out of the Databoss system of Florida Computer in Miami. A PDP-11 running under RSTS-E with Lexiboss can deal with 26 simultaneous

users and over 200,000 documents. Different classes of user, and different levels of security, are provided for in Lexiboss. Some users input data or edit and classify it when it is in, while others can only inspect it.

## Amdahl predicts a 40% rise in orders

AN increase in Amdahl worldwide deliveries of 40% over the 1979 figure of more than 100 machines was forecast for 1980 by Bill O'Connell, senior vice-president for marketing, in London last week.

With the company's treasurer Ed Thompson, and Dr Andy Wang, director of technology, O'Connell is touring Europe making a series of presentations to users and prospective customers.

O'Connell said he expected business volume to be up by about 20% in 1980 but agreed that the swing from buying to leasing had caused some problems. Sales of machines had fallen from about 80% of business to 50%. As an example of the impact this could have on

turnover, he said a sale could produce £1.5 million whereas a lease meant an income of about £50,000 a quarter.

"This can be a good thing in the long term, but it can cause problems of cash forecasting," said O'Connell.

To cope with these changes in the market and in support future development and expansion Amdahl had arranged a \$250 million line of credit in the US and a further \$100 million had been raised in Europe.

As far as the market in Europe was concerned, O'Connell was emphatic that Germany would be the best area for Amdahl. He rated it to have twice the potential of the "other three majors", the UK, France and Italy. The UK at present has about 18 users

compared to 10 in Germany, but O'Connell said that this was because the UK operation under Peter Williams had been running a year longer.

Commenting on the coming IBM H-series, O'Connell agreed with the view that it was unlikely to appear before 1981 adding, "We will be ready for it when it comes, and we will be better off because of it."

He would not express an opinion of what technology IBM might use — "we never discuss IBM unless we have to" — but dismissed the likelihood of Josephson Junctions being used. "I could retire in 1981 and not be worried by machines based on Josephson Junctions," he said.

Technical director Andy Wang supported this view and said that Amdahl would be using ECL devices in its new range. These gave the necessary reliability combined with speed and capacity.

In respect of devices based on gallium arsenide, Wang said he thought that these would become economically practical over the next five to 10 years, but it was likely that this technology would be used sooner in government-supported projects.

Several companies are already claiming successful development with this material.



## Quicker response with ITT

TRUCK maker Foden of Sandbach, Cheshire, has installed a 30-terminal ITT 3280 visual display system to improve its response time to customers' inquiries. All departments in the company update the relevant parts of the database held under IBM's IMS database management system. The information is then available to enable the design department to put together a final specification within half a day on any configuration of vehicle required and for the

service organisation to quote on delivery of parts to depots and distributors around the world.

The £60,000 system is a plug-compatible replacement for the IBM 3270 information display system previously used. The ITT system is said to have the advantages of better control on the terminals and easier transmission to a printer of a screenful of text.

Planned here is one of the many ITT 3280 screens.

## Bureau arson charge—five cleared

FIVE out of six hotel workers who were accused of setting fire to the West End offices of Eurocom Computer Services were cleared of the arson allegation at Maitland Street Court, London, when the prosecution withdrew the charge.

But all six were sent on bail for trial at Knightsbridge Crown Court on other charges.

The six were now charged with entering offices in Newman Street, W1, on September 22 as trespassers and stealing wine, video equipment, three calculators, a calculator cover, a transformer and a fan heater, the property of Eurocom Computer Services and of Leamouth and Burchett Management Services and a clock and a lighter belonging to James Hule.

Hule is training manager of Leamouth and Burchett.

The accused are Anthony Houston, 19, a steward; Bradley Fehring, 23, Australian, a chef; Paul Taylor, 22, a commis; Nigel Beach, 19, a chef; George Coleby, 18, unemployed; and Brian Kingdom, 21.

Kingdom alone faces a new charge of damaging by fire offices and contents, belonging to Eurocom, Leamouth and Burchett and the British Health Care Export Council.

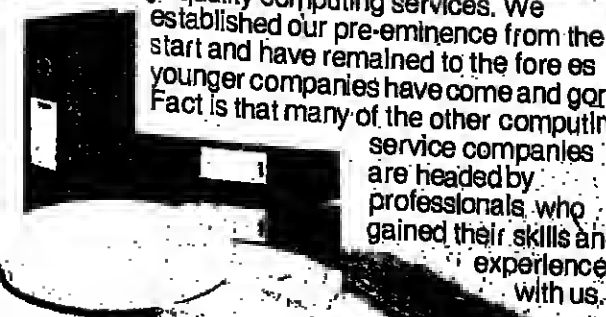
## Grant to university

A \$2 MILLION grant has been given to the University of Minnesota by CDB to help establish a development centre for microcomputers and information systems.

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## FOCUS

### The world of the engineer

THAT both the IDPM and the BCS are broadly in agreement with the recommendations of the Finniston Committee on Engineering is rather strange. The BCS would hardly recognise a computer engineer unless there was a brace of degrees attached to his title, while few IDPM members would regard the engineer as being a boom companion.

The report's proposal to establish a statutory British Engineering Authority to be administered by the Department of Industry will hopefully bypass the computer industry. Setting up yet another government quango is a proposal guaranteed

## Oops!

CONGRATULATIONS to all those eagle-eyed readers who spotted our statement that Roxburgh Electronics' FMC-100 three-inch minifloppy disc drive is "designed to interfere with eight-bit microcomputers" (CW, February 7). The word should, of course, have been "interfere".

And our item on the eight-part BBC television series on database systems (CW, January 31) did not make it clear that the programmes were only part of an Open University course on computer-based information systems, which is being supported by the university's computing service.

to maintain all the present problems and probably generate many more.

A few moments spent with a computer team would quickly dispel the report's complacency where professional engineers are concerned. As a breed, computer engineers are very independently minded. The common link between IBM engineers and the rest is their in-bred insistence that computing is a science based on technology. Compromise is just not on. Bypassing the fault, hoping for the best or finger-crossing are not valid expedients. Preferred operational mode is "everything off" and everybody — except the engineering team — out.

When approached, engineers adopt a casual air of indifference. Yes, they believe they have traced the fault, but until the appropriate spare board arrives they cannot be sure. Meanwhile they would not advise resumption of operations. Further interrogation reveals

that the part in question has not yet been summoned, it being lunchtime back at the engineering base.

From time to time, the engineering services manager arrives, possibly out of curiosity as to where so many of his personnel resources seem to spend their collective time. He gravely advises the DP management that he is not satisfied with the use of his machine. It is being grossly overworked and it is not surprising that faults are escalating. Additional PM time must be allocated plus a reappraisal of site engineering charges.

Engineers, then, are seldom the DPM's best friend. The thoughts prompted by the Finniston Report that most computer professionals can be regarded as engineers is notably disturbing.

DPM's skills are now far removed from the engineering base. Their role is to spread tact, diplomacy and large doses of encouragement. Any learning

which is done, is oriented towards the company, not the computer. Any steering is based on committee, not on control panel. The Finniston plan would have the computer industry labelled and classed — engineers and the rest.

Fortunately, there is plenty of time to be lost. The Department of Education and Science is holding a conference on the subject of computer education in the autumn. Let's hope that representative bodies will maintain unanimity and in the face of logic, opt for total independence.

## 10 years ago

From Computer Weekly of February 28, 1970:

TWO major local authorities, Coventry and Warwickshire, have joined forces to form a joint computer centre. The centre will be based at the Coventry City Hall. The Coventry City Council has agreed to provide the centre with a lease of 10 years. The Warwickshire Council has agreed to provide the centre with a lease of 10 years. The centre will be headed by a professional who gained his skills and experience with us.





Hamilton

## Programmers' biggest enemy

THE turn of the decade prompted the Press to indulge heavily in crystal gazing and there have been quite a few predictions which, if taken seriously, would fill the average programmer with panic.

Computer Weekly was in no way exempt from this trend, and included in our glimpse into the future was the conviction that in several years' time there will be

no room and no use for programmers.

The programmer's greatest enemy, as seen by the enlightened, is the software generator.

In January we said that automatic software generators and similar productivity tools are not something of the future and do already exist. We asked why they are not more widely used (Page Six, January 17).

Jim Hamilton has been working with software generators since 1967 and for him they not only exist, but are very much his friend and butler. He is now in charge of a one-man business called Cobra Systems and Programming which provides consultancy and development on Cobra.

Cobra, which stands for Cobol Rearranger, was conceived in

1968 by Hamilton himself and Alan Heywood-Jones.

Long before this, however, Hamilton had been interested in making the programmer's job simpler, and while working for Honeywell and Plessey had already made several important breakthroughs with Edward Averill.

"Honeywell had a report generator and a validating system," said Hamilton, "and basically we just made them simpler to use."

"When we both left Honeywell we met up again in 1968 at Plessey in Liverpool."

"Several school-leavers were there being trained as programmers who made all the usual mistakes, so we decided to do the same. The only trouble was that Plessey had an ICL machine, and at that time there were no report generators with ICL."

"We got one of the brightest trainees to write an update routine in Plan. At that stage Cobol came along and with it Dataxet, an update that performed control breaks."

"So far so good, but there were still two major areas where we were not progressing: data control — because we had no data dictionaries at our disposal, and also lack of flexibility. We needed to generate Cobol and also needed a dictionary system."

"Cobra was born in 1968. Originally known as CLS, or Cobol Library System, we changed the name as the facilities were extended. I left Plessey in 1971, but they still use Cobra there in a slightly different form. ICL, which I joined at that point, now sells Cobra with all its machines."

Basically, Cobra is a mixture of Cobol and Cobol extensions or macros, but as Hamilton pointed out, "People tend to get scared off when you talk about macros. Extensions sounds much simpler."

When the program has found a Cobol extension it executes a program written in Dollar language — which is just like Cobol but has the \$ sign in front of each verb — then converts the pseudo-Cobol into real Cobol, and the output is a Cobol program.

"The input can be a Cobol or a pseudo-Cobol statement," explained Hamilton. "Each operand is a parameter. The program reads the parameters as data and generates a piece of Cobol source. The clever bit is that you can actually state whereabouts in the source program you want the code to go."

"Cobra enables a Cobol program to be generated using only a third, if not less, of the usual code. Extensions are not new and have been used since 1963. However, if an installation is not writing its own extensions it is necessary to have a library."

"With Mark III there will be a library to be used by any installation," said Hamilton, "so just the right amount of code can be generated to do a job — no more, no less."

We asked Hamilton if he had encountered much hostility to

Cobra and systems like it. "Selling it is one of the most difficult things," he admitted. "I actually heard programmers that they don't like it because the boring bits have been taken out, leaving just the parts where they have to use their brains. I think that's the most attractive aspect."

Another popular argument against automatic generators is that use of them will reduce staff. "No tool reduces staff," said Hamilton adamantly. "Usually the numbers of staff are increased, not decreased, because a wider range of people are brought in to write programs."

But the answer to the question of why software generators are not more widely used is, in more complicated terms, more complicated. Often an installation has a set of fixed budget within which to complete a project, they like to be able to stick to it.

If some wise guy comes along and says "Look, I can do a half the time and use half the number of staff," nine times out of ten he won't be greeted with open arms. No-one likes having their routines interfered with.

"People must start thinking in terms of the effect on a business if something is finished in a time," said Hamilton, "in terms of how many programmers will be saved."

Hamilton is currently working under contract for Dataxet, the Swiss Bank. In a deal with Dataxet he acts as a consultant for the firm while developing and creating new products.

Some of the products currently awaiting release include: ANSI 81 structured programming facilities and a TP programming generator for the ICL 2903 ANALYSE function, which is currently available, is a Cobol extension which can set up whole programs except for processing.

"The aim is to make a program look like a program specification," explained Hamilton. "So not only are programs going to get shorter, they'll get more efficient."

The Swiss Bank now use Cobra after several years of similar systems in Switzerland. Are there any other installations where automatic generators are put to effective use?

### Puzzler

SPRING is in the air, and naturally your young puzzle solver's fancy is highly turned to thoughts of finding a suitable alphabetic for the word SPRING. Here is the puzzle with all ten digits represented.

SPRING  
RAINS  
BRING  
GREEN  
PLAINS

See page 53 for solution.

## SOFTWARE FILE

# Independent to fill IBM support gap

FOLLOWING IBM's move to centralise software support in Birmingham, an independent company is planning to fill the vacuum left by the change in policy. David Coplew and Mike Godman have set up Synapse Computer Services in the belief that many users feel vulnerable because it is now their responsibility to diagnose and circumvent problems before attempting to obtain a solution from IBM.

## ESC boosts its European marketing

THE European Software Co, the Irish systems house formed in May 1978, has opened an office in Stockholm to market Boole and Babbage products as well as its own range. The Swedish branch marks the completion of the company's plan to cover the major software markets of Europe with sales offices and subsidiaries.

As from May 1, 1980, ESC will be sole distributors for Boole and Babbage products in the UK, Europe and the Middle East, although the decision to withdraw the licence from CAP-CP was taken some time ago.

During the handover period CYP has had a co-operative and amicable relationship with its successor, which is a part-owned subsidiary of Boole and Babbage, and has used the time to build up its own improve range of products, now likely to provide healthy competition.

The European Software Co has released an extended version of Secure (Software File, January 3), the data security and housekeeping system developed by Boole and Babbage for IBM 300, 370 and compatible systems under OS, VS and MVS.

PEARL, the Process and Expert Automation Real time Language, is to become available on the Modular Computer Services' range of Classic computers.

The language has received considerable support from the West German Ministry of Research and Technology and is widely used there in metals industries, power distribution, continuous process and public utilities applications.

## Job control pack converter

THE Australian software house Clarke Computer Software, which has been steadily winning a market in the job control system JOL (Software File, January 17, November 15, 1979) has announced a DOS to OS converter for the language.

The company has a market-

ing agreement with Software Module Marketing of California, and has just sold its disc space management system DMS/OS to Shell Australia, already a user of JOL. DMS/OS interfaces with IBM's RACF and other security packages such as Boole and Babbage's Secura.

According to director David Coplew, the yearly agreement with Synapse would amount to less than half the cost of a full-time systems programmer, since users would only pay for the service they require.

## Stake in Spain

CISI, the French parent of the UK bureau SIA, has taken a 40% share in Centro de Calculo de Sabadell, CCS, the bureau subsidiary of the Savings Bank of Sabadell in Spain. CCS, based near Barcelona, operates two CDC Cyber 73s and one Cyber 171. Its turnover in 1979 was £6.1 million.

Godman emphasised that Synapse is not trying to replace in-house staff, but to supply specialist knowledge at a higher level which will help them make the most of their environment.

"In effect we are offering the same service that IBM used to, but no longer does; the friendly neighbourhood systems engineer. Employing freelancers is costly and offers no continuity, whereas Synapse staff will have detailed knowledge and documentation on an installation backed by extensive systems software experience, covering VS and VSE, CICS, DMS, and products like Librarian and Panvalet."

"The idea is to cover the danger of fewer and fewer people who know what's going on." He added: "Even IBM has encouraged us; we're already giving support to customers where it's just not worth the effort to IBM."

## Help for small workshops

SMALL to medium-sized workshops which have no computer facilities can now have access to the Computer Aided Planning and Estimating program from the Department of Industry's National Engineering Laboratory.

The Cape system has been adapted for use on an eight-bit microcomputer with VDU, which is available from the laboratory at

East Kilbride, Glasgow, for £10,900, including disc handling software and a Fortran compiler. The earlier mainframe system is still available in ICL, IBM and Univac versions. It covers all common machining processes but can be extended to incorporate specialised processes and other functions such as documentation.

## Online information system for hospital

NORTHWICK Park Hospital in Harrow, Middlesex has been using a system which is the result of a joint project between medical and computer staff in the DHSS and Perkin-Elmer.

A real time system based on P-E/32s enables laboratories and other departments to enter the results of analytical and clinical activities so that information on patients and administrative data is constantly available.

The system deals with online inquiries concerning admissions and bed status as well as dealing with medical archives. Other facilities include an automatic alarm for patient results outside accepted limits.

Northwick Park is a large district hospital with a national role in clinical research.

## T-ASK available on PDP-11s

THE online interactive query facility developed by Cincom Systems for use with its database management system Total is now available to users of Digital Equipment PDP-11s. T-ASK is said to be a "simple English-like information retrieval language" which enables database users to extract up-to-date data.

According to Terry Booth, Cincom's UK manager, T-ASK was developed for the DEC equipment following an excellent response to the IBM T-ASK, which now has more than 70 users worldwide. He added:

"DEC T-ASK has incorporated several features that reflect the unique needs of the DEC environment."

## Algol 60 compiler proves a success

THE Algol 60 compiler launched last year for Prime users by the software house Wootton, Jeffreys and Partners is having success among colleges and polytechnics. Its dozen users include Surrey University, North East London Polytechnic and Oxford Polytechnic.

# MAS-M

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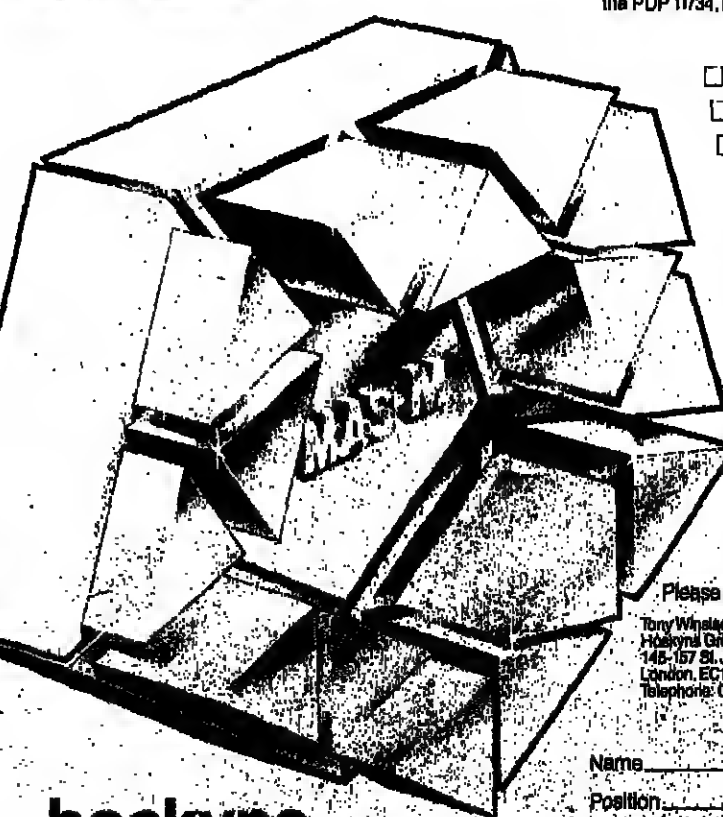
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## OP SPOT

### Flexitime and shifts

"My company is about to introduce a flexitime scheme. Is it possible for this to be used within the structure of a shift pattern?"

This question is put by an operator who works at a site where a three-shift pattern is employed — 8.30 to 4.30, 4.15 to midnight, and 11.45 till 9.15. Well, I don't know of any sites where flexitime is used within the shift pattern. As far as it, such a system might lead to complications, particularly in relation to the handover.

The handover is important. It is the time when shift teams meet and relate information concerning workflow and the state of the system.

It might be an idea to employ flexitime, but ensure that, say, three operators from the two shift teams concerned are on site at handover time.

I would be interested to hear from operators who work flexitime in any form.

# 'Breaking down jargon barrier helps us to get on with users'

by Bernard Allen

THE first time I ran into Barry Richardson he rather took me by surprise.

In a conversation perhaps more aptly described as a verbal shout-out, operations supervisor Richardson was first in the draw.

In essence, he said, "So you're the one who writes the Op Spot, are you? Well, I don't agree with most of the things you say, and I don't think you represent the views of the majority of operators."

My actual reply eludes me, although I'm sure that it wouldn't grace the pages of a publication such as this. I did, however, agree that he is entitled to his opinion, and emphasised that operations staff have only to pick up the telephone or put pen to paper in order to air their views through this column.

That little confrontation took place at the end of the first day of a conference on the future of operations staged in London by Infotech Operations. Anyway, Mr Richardson went his way and I went mine.

On reflection I had to admire the character. It's always refreshing to meet people who are willing to speak their minds, even — no, particularly — when it is to contest something one has said or, in my case, written.

On the second day of the conference I made a point of inviting Barry to lunch. We discussed the conference and operations in general, and by the time coffee was served he had agreed to an interview on the part he plays in the industry.

So, the other week, I went to Holden Data Services in Croydon, where Barry supervises

some 15 operators in the running of an IBM 370/145 and 370/148. The systems run under DOS/VS and support some 90 users online via IBM's Customer Information Control System, CICS.

It's the in-house bureau to the Holden insurance and underwriting group, and quite a busy institution, a fact well illustrated by the three or four telephone calls Barry received in as many minutes as we sat in the open-plan office.

Seeking some peace and quiet, we adjourned to a conference room, where he told me about the site and the part he plays there.

"One machine is dedicated to production work, while the other is used for development and providing back-up should the production system run into

problems," he said. "CICS is on from 8.30 in the morning till 6.30 in the evening. After that we run our batch work."

With online systems such as CICS, machine problems are at once evident to the user — a sick system means that he is unable to communicate with it through his console.

This tends to put extra pressure on the operations department, as its main aim must be to provide the best possible service to the user. A loss of service must be put right with speed and efficiency.

At Holden Data Services the configuration is such that all devices may be switched between the two systems. In the event of problems on the production system, the error recovery procedure goes something like this: Stop development work, switch all lines and peripherals across to the back-up system and restart production work.

Said Richardson, "Production work must take priority, so it's vital to have good back-up facilities — you know, two control units instead of one, two GPO lines instead of one; that sort of thing."

Problems can also occur at the user's end, on the line or terminal. Where local users are concerned, one of the operators will go along to see if he can help out.

The online system has helped to make him acutely aware of the needs and problems of users. So much so that he is only too willing to have his staff take them around the computer room and explain something of the workings of the machines.

"We are providing a service and so it's very important that we build a good relationship with the users," he said. "We take them into the computer room and explain things at a basic sort of level; this is a tape unit, a disc drive, CPU, VDU and so on."

"This is important as it helps break down the jargon barrier. When we talk to our users about a disc drive, for example, it means a physical device to them. It's not just a piece of jargon intended to baffle them. They know that and it helps us get on with them."

In addition to users, Richardson feels that it is extremely important for the operators to work at building good relationships with software and hardware support people.

The software side is no trouble as the technical support section lies within the operations department.

"I'm lucky in that respect because I just relate to the technical support manager. He used to be my operations supervisor and I like to think that we get on well."

Richardson advocates meeting the IBM engineers "on a give-and-take basis", but instructs his shift leaders to be firm where necessary. "Again I like to think that we have a good working relationship with our account customer engineer. You've got to work at it, but it's well worth the trouble."

"You hear all sorts of stories about engineers always being at the sites which have the best rest rooms. Well, I just try talking to them and what gets them here when we need them."

Much of his time is taken up dealing with the problems, needs and aspirations of his operations team. "We're not perfect by any means, but we're always looking

to improve our performance as a team."

It is with that purpose in mind that staff meetings are held on a regular basis. They enable the operators to put forward their views and ideas on the running of the installation.

"We held them last year but had to stop because of pressure of work and staff being on holiday leave."

"We tried having them every six weeks but found that it didn't fit in with our three-shift pattern. Once every five weeks seems to work quite well."

"We always take minutes, which are typed up and used for future reference."

Like many other sites in the industry, Holden Data Services has its difficulties in attracting and retaining staff of the right calibre.

"One of my main concerns is recruiting and keeping good operators. It's not just us though. The whole industry is faced by this problem."

Staff have left for a variety of reasons during the four and a half years Richardson has been at the installation. "People go for different reasons. We've got quite a demanding set-up, two online systems and over 90 applications, and some operators just don't seem up to it."

*You hear all sorts of stories about engineers always being at the sites which have the best rest rooms. Well, I just try talking to them and what gets them here when we need them.*

For that reason the site recruits at the junior level and puts the staff through its own training scheme.

"Three years ago we looked at the possibility of taking on trainees and we've had varying degrees of success. You can't just take people in off the street and make operators out of them."

"So we now take on a batch of trainees every year. Out of the 11 permanent operators we have at the moment, all but one were recruited as trainees."

New staff follow a "clearly defined training plan" during their initial six months at the installation.

"During the first three weeks they work from nine till five to get used to the people and the equipment."

"After that they spend six weeks on shift to see if they are able to put up with the demands of shift-work. Some people just can't do shift work and there is absolutely nothing you can do to help them."

They then do a week's formal training — they are sent along to Infotech Operations or follow a basic operating course on video.

"We train all our staff by a combination of on-the-job training, Infotech Operations and our own in-house video library. These include basic operator training, DOS and POWER, and IBM 370 orientation."

"At the moment we're discussing with the senior operators a new training plan for the next batch of trainees."

As staff progress they attend more advanced courses on DOS/VS and POWER, as well as those relating to telecommunications and staff supervision.



MORRIS EDWARDS REPORTS ON A MAJOR EXPANSION OF DEC'S COMMUNICATIONS SOFTWARE

# Moving closer to goal of a generalised net

WHEN Digital Equipment Corp announced its digital network architecture in 1975, its stated goal was ultimately to permit generalised interconnection of different host computers in point-to-point, multipoint or switched networks so that all users could share programs, data files and remote I/O devices system-wide.

With its latest network software products, DEC moves closer to that goal. Known as DEChet Phase III, the software adds communications support for multipoint lines and dynamic adaptive routing of messages through a multi-node network.

In addition, the software provides terminal access to remote systems, and enhanced network management features that can be centralised or fully distributed throughout the network.

Further, DEC laid the groundwork for interconnecting its systems with computers from IBM and other suppliers by introducing an emulator for IBM's Systems Network Architecture and making a commitment to support the X25 International protocol standard for packet-switching networks.

DEC's SNA protocol emulator software allows its PDP-11 computers running under the RSX-11M real time operating system to emulate an IBM 3790 cluster controller for interactive communications with an IBM host supporting an SNA network.

With the emulator, the PDP-11 system can function either on a point-to-point line to the IBM host or on a multipoint line with other SNA devices.

The SNA protocol emulator can maintain up to 81 concurrent, interactive logical connections with one or more programs in the SNA host. It uses IBM's SDLC line protocol and supports up to four synchronous lines at speeds to 8.8K-bps.

Three levels of access to SNA

protocols are available, ranging from interaction with applications in a CICS or IMS environment to SNA session initiation, termination and data flow control. In addition, the emulator offers network management features to aid in fault isolation and line evaluation.

The RSX-11M/SNA protocol emulator can be used as a memory-resident package, or in conjunction with a KMC-11A microprocessor equipped communications interface for improved line efficiency. Delivery is scheduled to begin in April.

As for its support of the X25 protocol, DEC sees this as another important communications gateway between its systems and other computers in mixed-vendor networks.

Andy Knowles, vice president, technical products, reports that the digital network architecture has been designed to accommodate an X25 interface, and that DEC will provide details of specific X25 implementations as the products become available during the next two years.

DEC's Phase III product announcement comes almost five years after the unveiling of Digital Network Architecture. DNA is a system of layered protocols that establish links and govern data transmission between computer systems. DECnet products embody the DNA architecture and facilitate construction of distributed processing networks with DEC computers.

The first DECnet software products provided for task-to-task data transfer between real time systems of the PDP-11 family over point-to-point links.

In February, 1978 DEC announced the second phase of products, which extended the network capability across all major real time, time sharing, and multifunction operating systems of the PDP-11, Vax, DECsystem-10 and DECsystem-20 computer families. DECnet Phase II also added the facility to copy and transfer data files from remote systems on user command.

Further, real time PDP-11 and Vax systems could now engage in remote resource access, which meant that users at one network node could open, read, write and close data files residing in mass storage at another node.

With its Phase III products, DEC has now concentrated on extending the communications functionality to include multipoint networks and adaptive path routing. Phase III also introduces the concept of "network command terminals", which give users at one node direct access to any other DECnet node using the same operating system.

Prior to Phase III, DECnet only supported point-to-point communications between pairs of nodes that were directly physically connected.

Now, with the multipoint capability, a host or master system can communicate with up to six remote or slave systems over a single line.

The host controls communications, polling each slave system in turn. Slaves can communicate with each other through the host, and multipoint configurations can exist as subgroups within larger networks.

enabling both master and slave systems to porticipate in message routing, file transfer and resource access with other systems.

Even greater flexibility is afforded by the adaptive path routing capability, which allows a DECnet network node to send messages to another through up to five intermediate nodes.

Each node maintains a routing table for the entire network. When more than one path exists between the source and destination nodes, the network automatically selects the "least-cost" path according to

line values assigned by the network manager. Initially, the routing tables are generated automatically when the software comes online. The values for each line are primarily determined by its bandwidth or data rate capability.

Routing tables are updated whenever changes in line or system status occur.

Besides optimising traffic flow, the DECnet Phase III software provides network managers with the means for evaluating overall network efficiency and initiating diagnostic tests to isolate network faults.

These management functions can either be centralised or fully distributed across all nodes. They permit monitoring of communications loads, error rates, line conditions and node status at all points in the network.

Another capability of DECnet Phase III, the network command terminal software, provides users with direct access to programs and devices on remote systems anywhere in the network that use the same operating system.

According to Knowles, there are over 500 DECnet networks in operation, supporting over 2,000 nodes. In the future, he

believes, the ratio of nodes in networks may rise as much as fivefold.

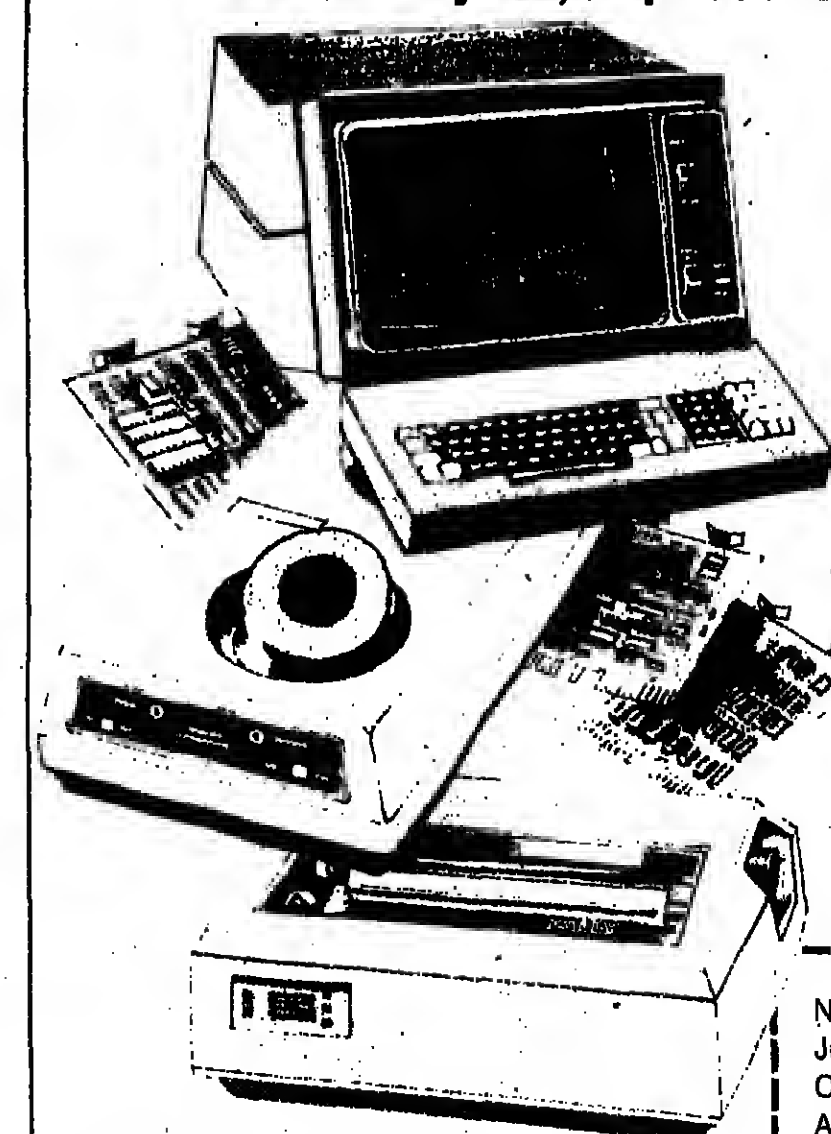
"New DECnet software will make large networks of 20 or more nodes easy to manage and more economical, as routing and multipoint capabilities lower communications expense," Knowles said.

"Forthcoming DECnet releases and other future product announcements will point toward distributed data processing as a major marketing thrust of this decade, bringing computing and its benefits into more lives with greater success and lower cost."

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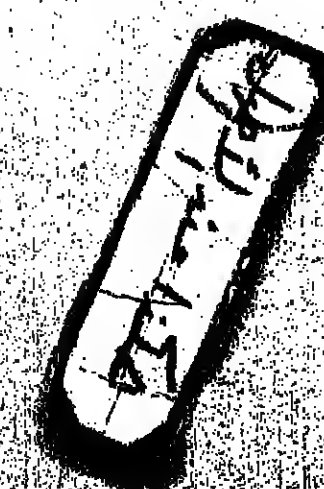
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## THE ALPHA MICRO COMPUTER



## MICRO NEWS

## Speeding up production at IBM

COMPONENT manufacturers are under a lot of pressure to produce a great variety of circuits, and quickly, with fast turn-around time, as a real priority. The IBM response has been the QTAT (Quick Turn Around Time) production line, which was described at ISSCC.

QTAT incorporates:

- Automated wafer handling and storage systems, including air track wafer handling, with wafer storage provided by a sector transport system and strategically placed buffer stations.

- Laser scanning keeps track of wafer serial numbers.

- An automated process control system.

- A software-controlled wafer routing system which guides through the manufacturing sequences.

- Automated control of process parameters such as temperature, pressure, deposition rate, and voltages. Data is recorded on each wafer.

- Feed-forward process control, which sends production data on individual wafer to downstream tools on the QTAT line. This feature enables

improved precision process control during wafer production operations.

- The ability to handle single wafers as well as batch processing of multiple wafers.

- Computer terminals in a manufacturing control centre on the QTAT manufacturing line, for monitoring the wafer processing operations and logistics, and for providing access to all levels of computer process controls.

- Centralised distribution of ultra-pure chemicals, gases and materials used in wafer production processes.

Dr. Ning-Gau Wu of IBM's General Systems Division holds the end product of QTAT. It is an 82mm silicon wafer, ready to be doped into 4.8mm<sup>2</sup> chips, for customised logic circuits.

Barrie Nicholson reports from the International Solid State Circuits conference



## Japanese 256Ks may steal the lead

SEMICONDUCTOR devices of 64K density were positively run-of-the-mill at this year's International Solid State Circuits Conference in San Francisco which included announcements of two 256K dynamic RAM and a four-megabit ROM on a wafer.

Coming from Japan, they added weight to Texas Instruments president Fred Bucy's opening remarks that the US may lose the lead in microelectronics during the 1980s through under-investment.

The 256K devices come from NEC-Toshiba Information Systems and NTT's Musashino Electrical Communication Laboratory. No novel manufacturing processes were used in NEC's chip except 1.5-micron photolithography. However, even with this fine geometry the chip measures 4.84 x 8.59 mm. It is in a 16-pin dual-in-line package with larger internal cavity, for compatibility with existing 16K and 64K RAMs. Access and cycle times are 160 and 350 nanoseconds. Active/standby currents are 45 and 5 milliamps. It runs from a single five-volt supply.

Alpha particles promise to be a major problem with devices as dense as this, and several protective steps have been taken. Memory cell capacitance is large enough for the soft error caused by one particle, critical areas of digit lines are as small as possible and a special protective coat is applied to the chip surface.

Using one micron geometry by electron beam writing, the second 256K RAM from NTT looked more advanced. Based on a special molybdenum polysilicon technology, the chip measures 5.83 x 5.9 mm and has access/cycle times of 100/200 nanoseconds with power dissipation of 230 milliwatts. Standby power is 15 milliwatts. It runs from a single five-volt supply.

supply. Extra circuitry consisting of sense circuits and about 4K of memory is included. IBM contributed two papers to the RAM session on a bipolar five-volt-only 64K RAM, and a 16K static RAM in merged transistor logic T<sub>1</sub>L. Based on a bipolar analogue of a field effect transistor cell, the 64K chip has an access time of 50 nanoseconds, and cycle time of 100 nanoseconds.

Development of static RAMs remains behind dynamic circuits in density but offers better speed and power. IBM's 16K static RAM accesses in 45 nanoseconds with an operating power of 225 milliwatts and standby power of 130 milliwatts. It can operate from a single power supply between 2.8 and 5.5 volts though an additional 1.7-volt supply lowers the power consumption figures to 225/130 milliwatts.

Two more 64K RAMs were described at the conference, the long-awaited Texas Instruments TMS 4164, and a device from Hitachi.

TI's device runs from a single five-volt supply and was designed with three goals in mind: chip area to be less than 35,000 mils<sup>2</sup> (square thousands of an inch); maximum power consumption of 200 milliwatts (at five volts); maximum access time of 150 nanoseconds.

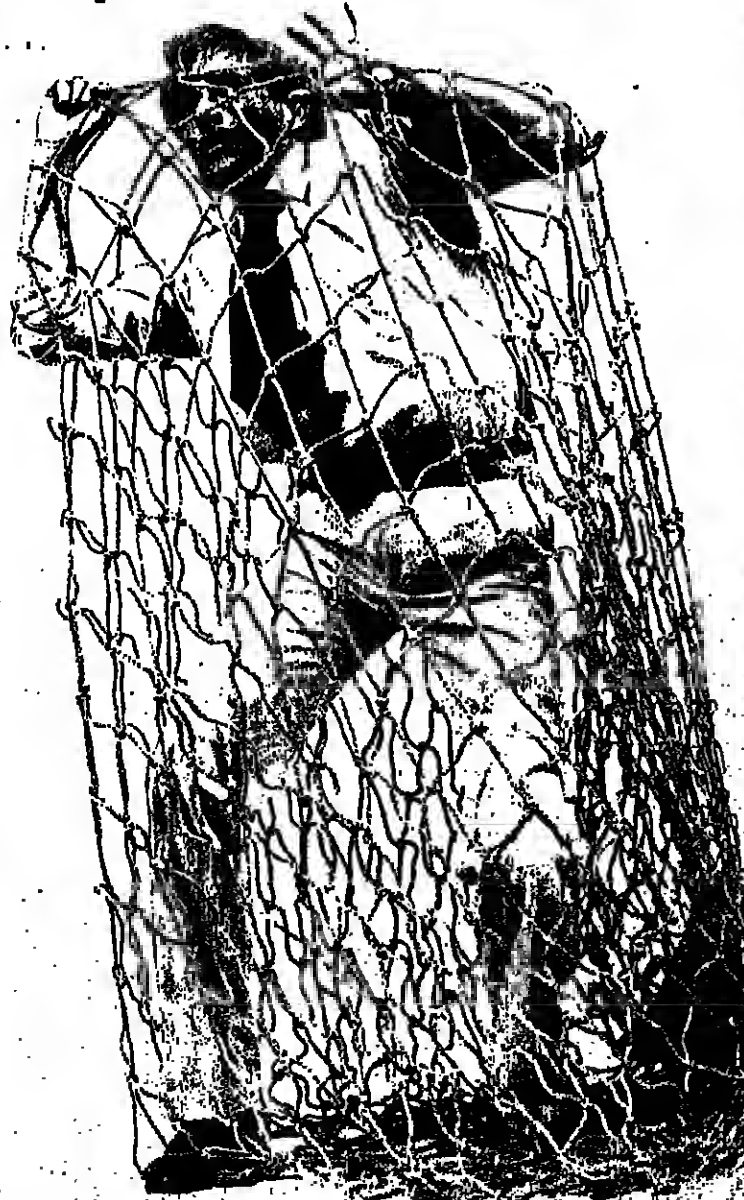
It exceeds all these requirements with a chip size of just over 34,000 mils<sup>2</sup> (equivalent to a square chip with 4.67 mm sides), a worst-case power dissipation of 200 milliwatts, and access time of 100-150 nanoseconds at a cycle time of 250 nanoseconds. Hitachi's device also requires just a single five-volt supply and has a typical power dissipation of 170 milliwatts at 300 nanoseconds cycle time. A special alpha particle protection coat has been applied to the chip surface.

The largest memory described was a four-megabit ROM linking

up a whole 3-inch wafer. Designed by NTT for use as a Chinese character generator, the chip is organised in duplicate halves for fault tolerance.

## Looking at large interactive system DECsystem-10 or -20.

Don't get caught up in an expensive multilayered software solution.



Interactive computing isn't something you can graft on to a batch hardware or software tradition. It must be designed in. Or you lose time and money.

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## Information laws setback in Canada

DRAFTING of freedom of information legislation in Canada has gone back to square one following the Liberal Party's victory in the General Election. The Conservative Bill (C-58, November 8, 1979), which had reached committee stage when

Parliament dissolved, has been lost altogether but the newly-reinstated Prime Minister, Pierre Trudeau has, after some delay, announced that he will introduce another Bill.

On the thorny question of whether there should be judicial

review over the withholding of documents by government, Trudeau said his initial Bill would not include this but he would listen to the arguments put forward.

Freedom of information campaigners are interested in what happens in Canada because this would be the first country with a Westminster-style Parliament to have such laws.

It is unlikely Trudeau will be in a hurry to bring in the legislation but he may do so by July.

## Commons online soon

THE choice of a computer to provide MPs with online indexes to research material is expected to be made soon. This, at long last, will bring to fruition plans for computerising the House of Commons library which stretch back to 1874.

Planned for inclusion on the system initially are the contents of existing strip indexes in the Commons library covering Parliamentary questions, European matters, and scientific information. These strip indexes have only limited cross-indexing and rely very much on the skill and knowledge of the library staff. They are also difficult to update.

With the computer, MPs and their staffs will be able to search using personal names and keywords, without having to go in the library to do it. Communications facilities will be essential anyway — it has been decided there is no room for the computer in the Palace of Westminster, so it will have to be sited elsewhere.

The Central Computers and Telecommunications Agency will pay for the machine and run it. At the House of Commons the project is being overseen by computer development officer Richard Morgan.

## Prime additions

PRIME has introduced two 32-bit microcomputers with prices as low as £38,000 for end users and less than £32,000 for systems builders. The end user machine, the 250, is a less powerful version of the existing Prime 450 while the model for systems builders, the 150, is based on the existing Prime 450.



## Electronic typewriters launch

IBM's two electronic typewriters, the Model 60 and Model 60, have been launched in the UK, 18 months after their introduction on to the US market (CW, June 15, 1978). Both are priced at £1,250, and the 60 has a single-line memory and proportional spacing, while the 60 has 736 characters of RAM storage without proportional spacing.

Other companies such as Oyx and Olivetti have similar machines at the bottom end of their word processor ranges, but unlike them

IBM uses a golfball plunger in the 60 and 60 instead of a daisy-wheel. Error correction is by "lift-off" tape, up to a whole line at once if desired, using the line buffer.

Formats including different margins and tab stops can be held in memory, and there are other features such as automatic centring and decimal point alignment.

Machines for the UK market will be made in Amsterdam.

Published by Heinemann at £8.50 the book includes over 150 illustrations in its 415 pages.

## 400-page history of telecomms

MUCH of the history of telecommunications is traced in a new book, *Girdle Round the Earth*. It was commissioned by Cable and Wireless and the history centres on that company and its predecessors, Imperial and International Communications and the Eastern Telegraph Company, from the latter's foundation in 1851.

The book, by historian Hugh Barry-King, tells how the present company name was taken from the uniting of the two competing technologies after wireless had "deprived the cable companies of half their traffic at a stroke".

Having recurrently attracted the opinion that it was about to waste away, overtaken by modern developments, the company has continued to flourish, and tripled its turnover between 1974 and 1978.

Its 1978 income accounted for two per cent of the UK's net invisible earnings.

Published by Heinemann at £8.50 the book includes over 150 illustrations in its 415 pages.

viewdata

First World Conference  
& Exhibition on Viewdata,  
Videotex & Teletext

26-28 March 1980,  
Wembley Conference Centre

The conference will examine the current status and potential of the various viewdata, videotex and teletext systems both in this country and overseas.

This will include discussions on the British Post Office's Prestel system with special sessions describing French, Canadian, U.S. and Japanese systems.

Other streams will deal with various viewdata/teletext applications, electronic publishing, private viewdata systems, and teleconferencing.

A special discount is available on all registrations received with fees by 20th February 1980.

The Prestel Show

This will be a highlight of Viewdata 80. Co-ordinated by the Post Office, it will be a significant part of the post office launch for Prestel and will include sessions for special interest groups, together with presentations intended for the general public.

The Exhibition

Over 500 exhibitors will show a complete spectrum of equipment and services to the major manufacturers of VDU's and terminals. A 400 representative of the VDU industry will be exhibiting their products and services.

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## PEOPLE and EVENTS



## NCR sponsors concert

**RICCARDO MUTI**, music director and principal conductor of the Philharmonia Orchestra is seen here with **William Anderson** (left) chairman and chief executive of NCR and **Rae Patel**, chairman and managing director of NCR (UK) during rehearsal for a concert which was sponsored by the company. The concert took place at London's Royal Festival Hall and was also broadcast live on BBC Radio 4. It consisted of *Verdi's The Seasons* with Carl Pini as the violin soloist, and Beethoven's *Pastoral Symphony*.

## Honorary treasurer appointed at BCS

CONTROLLER of computer and management services at the London Electricity Board, **Richard Paine**, has been elected honorary treasurer of the British Computer Society, to succeed **Doug Eyles** who resigned on his appointment as director-general of the CSA.

Paine has been involved with computers since 1955 when he was a programmer and analyst, and has been in management since 1980. He has also been an active member of the BCS, having served three spells on council.

He was treasurer of the society from 1961-63 and was a founder member and secretary of the BCS East Anglian branch.

**Ray Simpson** has been appointed a director of Aughton Automation. He remains as director of Aughton Instruments and is now managing the company's operations in Peterlee.

**Helen Gibbons** has been appointed assistant secretary of the Computer Retailers Association. The association was formed several months ago and membership is open to companies in the computer field which have a significant interest in supplying microcomputers to end users.

**David Gordon**, formerly general manager of Datapro's Aldershot office and a former manager of BOC Datasolve's Aldershot, Sunbury and Guildford data preparation operations, has now joined Systemsolve as territory manager for the West of England.



Humphries Stahl Van't Hoff Collins

## IGL prize for student

A PART-TIME computer course brought more than one academic satisfaction to **William Craig**.

**Craig**, who took the course at the North East London Polytechnic, gained not only a Higher National Certificate but also the IGL Prize which is awarded each year to a student from the Polytechnic Department of Systems Computing who has made the most significant contribution to the final year of the course.

**Craig** received a certificate and the £40 prize at a ceremony at the Polytechnic's main precinct.

The awards were presented by **David Firnberg**, managing director of Unilever-Norwich former director of the National Computing Centre.

**David Wray** has been team leader in the communications department, part of application software division at Arvat UK. He was previously manager of program area with UCC.

**Graham Locke** has been moved within Centronics Computer (UK) to a executive. He joined the company last year in sales and was formerly a school teacher. **King** has become a sales and executive.

## DIARY

**MARCH 3** SNA and its alternatives, and AGM. BCS Data Communication group Institute of Education, Bedford Way, London. 10.30.

**MARCH 4** The impact of automation. BCS, IEE, Savoy Place, London WC2. Tel: 01-240 1871 ext 201.

**ADA** — the US Department of Defence real time language. BCS North Staffs group, Ambassador Hotel, Newcastle under Lyme. 20.00.

Online information users in Scotland. BCS Information Retrieval group in Inauguration a Scottish group. Contact L. Corbett, University of Stirling, Stirling.

**MARCH 5** Query languages. BCS Database users. University College, London. 14.00.

**MARCH 6** Fault tolerance. Prof M. Bruer. BCS, IEE, Savoy Place, London WC2. Tel: 01-240 1871 ext 201.

The electronic office — Girl Friday at the Microprocessor — Future trends. IEEET, Imperial Hotel, Exeter. 18.30.

Discussion meeting on the Finnmark Report. IEEET, Thompson Arms Hotel, Seckville Street, Manchester. 10.15.

**MARCH 11** Data protection legislation and the likely effect on you. IDPM Essex branch, County Hotel, Rainford Road, Chelmsford. 20.00.

**MARCH 13** Pet — the microcomputer for business, industry, education and the home. IEEET, The Sussex County Cricket Club, Hove. 19.30.

Cobol and Micros. BCS Cobol specialists group. 13 Mansfield Street, London. 14.15.

The future of MT in Europe. Prof Y. Wilks. BCS Natural Language Translation Specialist group. King's College, London. 19.00.

Getting the best out of your system — introduction to capacity management. IDPM Central London branch, Pearl and Dean Studios, 9 Broadwick Street, London W1. 19.00.

**MARCH 18** The complexity of problems and the Human Mind. British Chapter of the ACM. BCS HQ, 13 Mansfield Street, London WC1. 18.30. Tel: 01-980 4811 ext 928.

**MARCH 19** A practical solution of an LP problem involving semi-continuous and dual integer variables with a nonlinear objective. BCS mathematical programming study group. London School of Economics, London. 18.30.

**MARCH 19-20** IBM CUA: Local Authorities group. County Hall, Piccadilly Gardens, Manchester. Tel: 01-611 1843.

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## US info management show comes to Europe

REACHING the office environment was the aim of exhibitors at last week's IMEC Information Management Exhibition and Conference at Weimbley.

Although the event is a new-comer to Europe, its organisers, Clapp and Polak, have run it in New York for the past five years under the name Info and they claim to be well placed to cater for visitor needs on a more appropriate basis than a trade association or other organisation that would identify with product groupings.

In this case visitor interests were identified from the expectation that the 1980s would see half the working population of the industrial nations engaged in some form of information processing. Management should

PABX extension lines through which any number of terminals can be linked to the system four at a time.

Terminals supported by the system include the Micropad input device for hand written messages. By using the group destination function, hand written messages can be sent to any number of recipients in the same way as telex messages or text from communicating word processors.

By using the Post Office's Midnight Line facility messages can be stored and sent overnight anywhere in the UK at a fixed cost of £220 a year for any number of messages. The messages can go either to a printer or can be held in the mailbox in the switch nearest the recipient.

Facsimile transceivers are also supported and, by using the Fax Comp, compression unit available under licence from Compression Labs in the US, up to 30,000 pages can be stored and then sent at less than a minute per page to a machine in any of the three CCITT speed groups, so long as it has a decompression unit in front of it.

Asclit facsimile conversion is a possible later addition and the company may also develop an interface to support videodata terminals.

Data rates up to 19,200 bps are implemented and up to 3,000 messages of an average 500 characters can be handled in an hour.

Systems without peripherals range from £15,000 to £75,000, while a switch with four telex ports, two eight inch floppy disc drives, three terminals and two printers would cost £25,000. The switches are based on processors from the Computer Automation Naked Mini Series 4.

Another networking system was on display by Tran Telecommunications. The Swindon-based UK subsidiary of the US digital network manufacturer, Tran's M3200 networking system is now installed in the UK for W. H. Smith and the main parts of the system were on the Tran stand: the M3201-2 digital switch and the

M3212 statistical multiplexer.

The Tran product is also based on a Computer Automation Naked Mini Series 4, but it switches data at up to 14 kbps and can therefore handle digitised voice traffic. Tran claims to have been the first manufacturer to integrate all types of traffic into one networking system and managing director Bob Mayo quotes the 1976 Minc-Nora report to the French government as saying there was a danger that the integrated network market was becoming a Tran monopoly.

An M3200 network user is likely to start with a switch and two statistical multiplexers, each with 122 channels, costing a total of £150,000, according to marketing manager Glenn Russell. From then the system is designed for modular expansion, both for increased capacity and for additional functions such as support of X25, SDLC or BSC protocols and conversions between them, as well as modems and test equipment like the XPRT X25 protocol tester, line monitor and terminal simulator.

A major part of the product philosophy is to make the network transparent to user connections across it so that a view-data or digital facsimile link can operate as normal, and simple terminals linked to complex communications software in host computers can not only operate without modification but can also gain some of the flexibility of a packet network by accessing alternative hosts.

For W. H. Smith a function was implemented in the network that allows asynchronous terminals to link to ICL Communications Controllers which use the ICL 7181 synchronous protocol.

A forthcoming facility to be made available in the UK under licence from CTX Cambridge Telecommunications in the US,

## Newcomers at the exhibition

TWO UK exhibition newcomers at IMEC were videodata specialist **Jasmin Electronics** and the US manufacturer of IBM-compatible systems, **Magnuson**.

**Jasmin**, which has been involved with videodata and teletext since its early days, has developed a multi-terminal videodata editing system based on multiple Motorola M6800 microprocessors, and an industrial teletext system. A four-terminal videodata system has been ordered by the Birmingham Post and Mail, which runs the Viewtel

database on the Post Office's Prestel videodata service. The system will run up to 10 terminals.

The industrial teletext system has reached the online trial stage at Heathrow Airport after a three-year contract with the British Airports Authority.

**Magnuson** showed its MBO series machine. It claims the system has twice the price-performance ratio of the IBM 4300 series and mid-range 360 and 370 machines.

allows terminals attached to an IBM 3270 cluster controller to access multiple host computers, which are then addressable from the keyboard, and allows them to connect to an X25 packet switched network.

CTX developed the product about two years ago and was recently bought up by the telecommunications giant GTE and made part of its Telenei packet network subsidiary, which would obviously have a strong interest in helping IBM users to make use of X25 networks.

In the UK the system is likely to sell, under the Tran part

number M3225, at £10,000 plus £300 a month licence for the software to run in the IBM 370X front end processor.

Videodata was also a perennial interest to Tranley Software which launched the Lexiboss document retrieval system it developed with UKAEA (see page 3). Managing Director Derek Sully said that right after the show the company would get to work on a module for supporting videodata terminals and reformatting for display as videodata pages the text held under the Database management part of the Lexiboss system.

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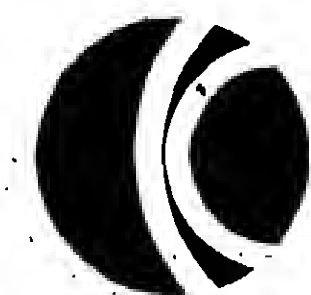
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COMPUTERMARKET 80  
PREVIEWComputer Mountain  
goes to  
Mohammed

AS the excitement and merriment of the start of a new decade fade away, computer companies are turning once again to showing off and selling their wares. First in line this year is Computermarket 80, the seventh exhibition of its kind, although it was originally called Computer Caravan.

The exhibition follows a "mountain coming to Mohammed" routine by touring a number of city centres in a matter of weeks. Computermarket 80 begins life on March 4 in Birmingham and ends in London (via Manchester and Glasgow) about three weeks later on March 27.

Response to the multi-venue idea is said to be high and the organisers, Couchmead, have had to set up a special exhibitor waiting list for each location.

Traditionally, three types of visitor have attended the exhibition — data processing

managers, OEM/systems builders and first-time users and DIY computer enthusiasts.

Among the word processing systems on show at Computermarket 80 will be the Comma Writer. This has been developed in the UK by Comma Computers, the systems and terminal distributor based near Brentwood, Essex. Using software developed in conjunction with an unnamed UK university, the Comma Writer is based on the Ninth Star Horizon microcomputer and has a twin floppy disc drive and a high resolution VDU and Diablo printer. By adding standard software packages the company says that the Comma Writer can be extended beyond just word processing work to handle payroll, sales invoicing, stock control and other business applications.

Priced at £6,950 the system comes with a one-year hardware and software maintenance agreement and full operator training. Equinox Computer Systems will exhibit a range of commercial, scientific and educational microsystems which includes a word processor with a price tag of about £6,000.

A desk-top microsystem, the Mael 5100 is one of two launches to be made by Computer Ancillaries Ltd. The Mael 5100 is a 16-bit machine designed for business applications and it can be supplied with compilers to handle Commercial Fortran, Commercial Basic, Fortran, Cobol, RPG 2 and Pascal. Floppy disc storage is expandable up to 2.7 megabytes, and for a 64K machine the cost will be about £9,700. For an extra £1,300 a printer and a range of application packages are included.

CAL will also show, for the first time, a range of software developed by CAP for use on the Durango desk-top micro.

Rair will exhibit its Black Box II microsystem based on the Intel 8085A. It comes with up to 64K of RAM and features a multi-user operating system that can handle 16 terminals simultaneously. As an option, a hard disc system giving up to 10

WHERE AND WHEN  
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Manchester: March 11 to 13  
New Century Hall, Co-  
peration Street

Glasgow: March 18 to 20  
Albany Hotel, Broom-  
field Street

London: March 26 to 27  
West Centre Hotel, Lea-  
road, SW8

megabytes of storage is available. The Black Box II supports Cobol, Fortran and Basic.

Making its first appearance at a Computermarket exhibition will be Hamilton Rentals Ltd. Equipment PDT 150 microcomputer. CAP-CP's Micro software packages. Among applications covered by packages are sales and marketing and purchase applications.

Hamilton is to show a range of computer equipment.

Computer  
Ad contest

BEING run in conjunction with Computermarket 80 is a competition to find the best Computer Advertisement of the Year, the proceeds of which will go to the British Computer Society. The contest is open to all computer users. Entries should be sent to the British Computer Society, 100, The Quadrant, London W1A 1AA. The closing date is 31st March 1980. The winner will be chosen by a panel of judges. The prize is £1,000.

manufacturers such as Hewlett-Packard, Digital Equipment Corporation and Texas Instruments.

From its office products, Hamilton will exhibit a Digital Equipment Corporation WD80 — a one or two terminal system. This comes with either two or four diskette drives and a 500 words per minute Diablo printer.

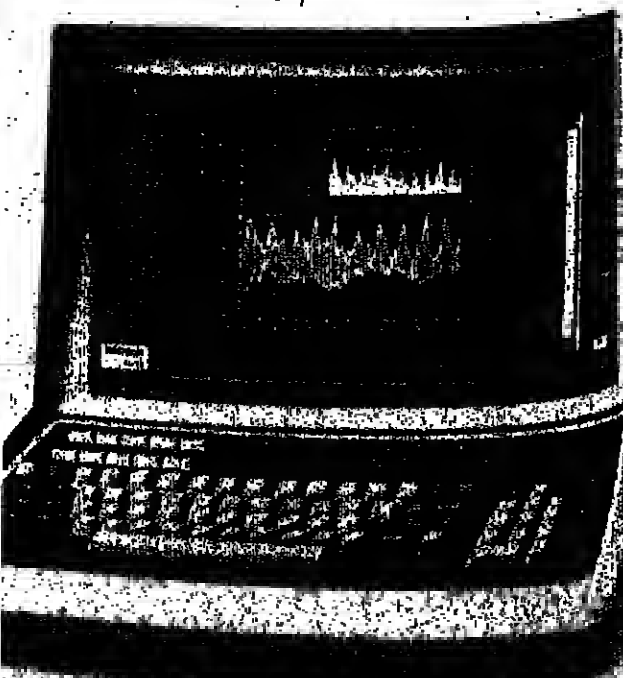
For those looking for solutions for their Commodore Pet, Computers of Ealing will demonstrate a range of stock control, word processing and complete record accounting packages. Prices start at £3,500.

A Pet-based income record accounting system will also be launched at a price of £3,500.

Rostronics is to exhibit its Micromation Z-Plus business system based on the Z80 micro.

Two new graphic systems

● Turn to page 21



The new Tektronix 4052 Desktop Graphics Computing System. Tektronix developed a processor that provides high speed and graphics capabilities. It has 32K of memory as standard and can be expanded to 64K.

New models make debut  
at the exhibition

● From page 20

have been announced by Tektronix. These are the 4052 and 4054 Desktop Graphics Computing Systems, and both offer high data processing speeds and special flicker-free screens. An internal magnetic tape drive holds up to 300K of data and the standard 32K of RAM can be increased to 64K.

The Tektronix 4052 comes with an 11-inch screen while the 4054 has a 19-inch screen.

An exclusive UK distribution agreement has been signed between Comma Computers and the manufacturers of the Princeton 8500 M range of micro-based graphics terminals. The Princeton 8500 M range features high resolution, intelligent graphics terminals which sell for about £15,000 and according to Comma they will complement the Sigma range of graphics systems that it already handles.

Another exclusive distribution agreement that Comma has signed is for a new micro-based plotter from Brown Boveri. Called the Servogor 281,

the plotter costs £2,750 and measures 18 inches by 17 inches and is only six inches deep.

Varying line colours and thicknesses can be achieved via the eight programmable pens on the plotter, while an optional feature is a programmable paper feed for handling continuous stationery.

Among the computer peripherals to be exhibited by Lynwood is the Beta VDU which has half-intensity, blinking and underline and reverse video facilities.

A new VDU will be introduced at Computermarket by Pragma. It is called the Visual 200 and has a screen which can be tilted from 10 degrees to 15 degrees. The Visual 200 can also emulate the Hazeltine 1500, the ADDS 520, the Lear Siegler ADM-3A and the DEC VT-52 terminals. It costs £754.40 unbuffered and £823.40 buffered.

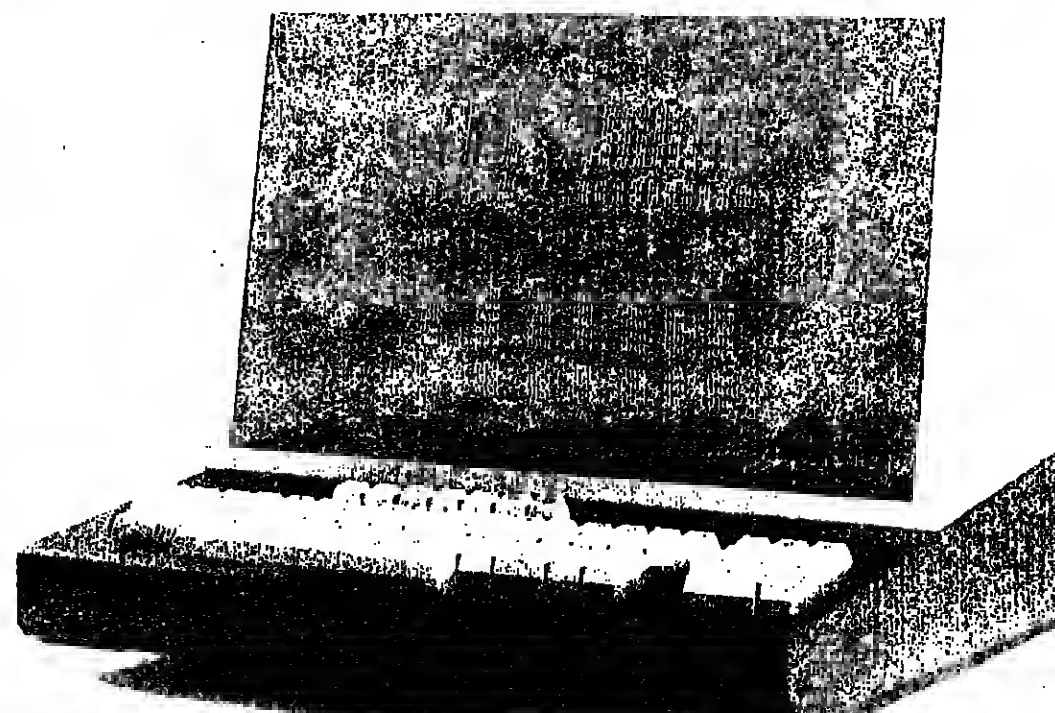
For £495 you will be able to buy a terminal called the Model 7000 from Newbury Laboratories. The terminal is Teletype compatible and has a 80 characters by 24 line green

phosphor screen. A new printer, the Model 8300, will also be on the stand. This has a 2K buffer as standard and a print speed of 125 cphs. Single end user prices start at £400.

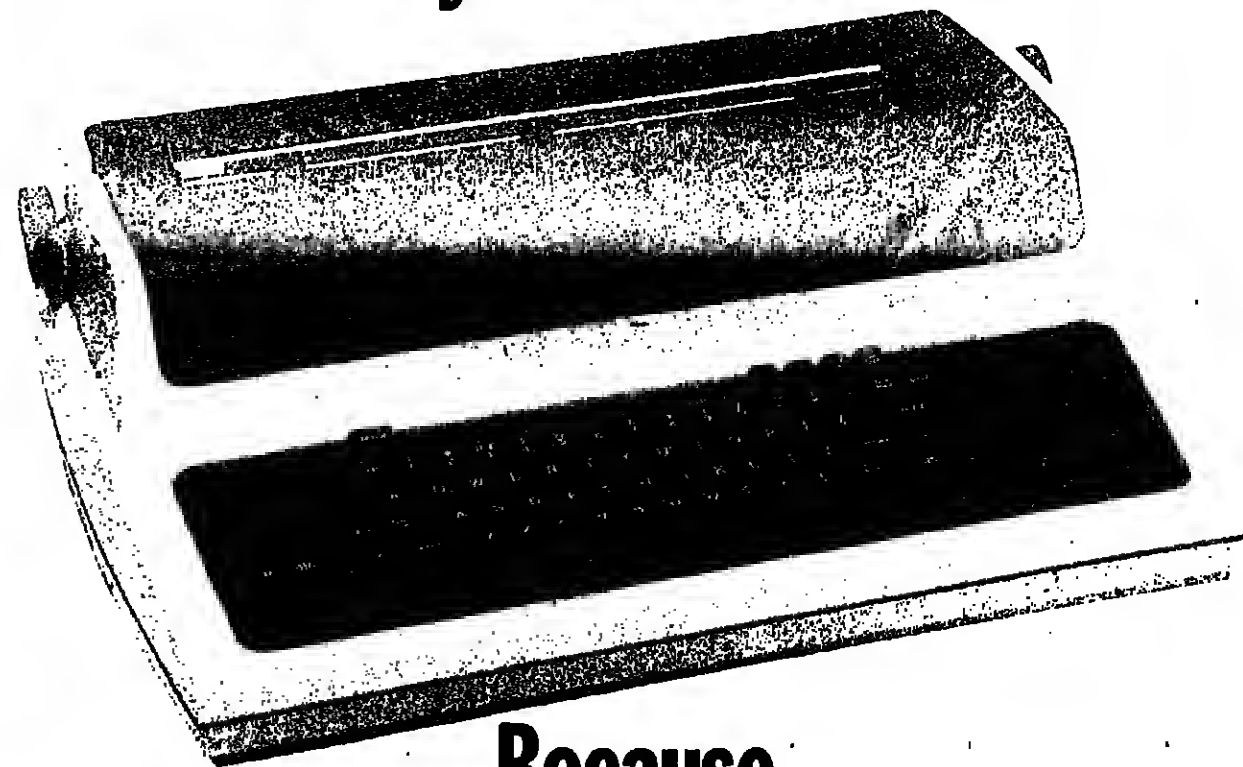
Adding to its 400 series of terminals, Harwoods Business Systems will exhibit two new models. One is the Teletape, a Tekex compatible VDU with 48K of memory and basic text editing facilities. The other is a VDU equivalent to the VT100 which has smooth scrolling and 132 print positions.

Highlight of the Anadex stand at Computermarket will be its new DP-9500 line printer which has up to 220 column print positions and costs just under £800 for the one off, end user price.

Among the range of equipment available for the DIY computer enthusiast is a long-awaited dual minifloppy disc system from Nascom Microcomputers featuring double-sided, double-density disc drives.



Two new peripherals will be on show at Computermarket 80 from Newbury Laboratories: the Model 7000 VDU and the Model 8300 matrix printer. Our picture shows the Model 7000 which is Teletype compatible and costs £495.

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## ADVANCED FILE DESIGN—Part 4

## Addressing concepts for direct files

STOCHASTICALLY organised files can be used to answer occasional inquiries using either a binary or statistically based search technique, see Part 2. The number of inquiries that can be handled in this way is very limited, however, as it will take 250-400 milliseconds just to locate the required record.

Reference lines can be cut to about a tenth of this figure by using a well-designed direct file. The term direct implies that, when a particular record is required, it is possible to retrieve it without scanning a large part of the file during the search. This means that the record key, which will be known from the inquiry, is related in some way to the record address.

The simplest way to arrange for this relationship is to store records in addresses that are directly linked to their keys, eg:

ADDRESS = KEY

ADDRESS = KEY + CONSTANT

ADDRESS = (KEY + CONSTANT) / BLOCKING FACTOR

There are many variations of this type of equation, due to factors such as differing disc starting addresses, blocking of records in form of keys. They all rely on one essential prerequisite, which is that the key sequence is unbroken, or at least nearly so.

Because a simple relationship

## BASIC FILE DESIGN

A new impression of Basic File Design will be available in March and copies may then be ordered from the General Sales Manager, IPC Electrical and Electronic Press Ltd, Dorset House, Stamford Street, London SE1 9LU. Price £1.90 each including postage.

provides a unique address for each record or block of records, the user may wish to preserve it even if this means that some addresses are unoccupied. A file stored in this way is called self-indexing. Even if the key sequence was originally unbroken, gaps occur naturally when stock lines are discontinued, customers get out of business or employees leave.

Preservation of the relationship by leaving up to half the potential storage space unoccupied may be justified: the file designer will be guided by the availability of disc storage and the importance of maximum inquiry throughput. At some point it will not be possible to waste more storage space as the key sequence deteriorates, and a different solution has to be found.

If the gaps are large but relatively few in number, a table can be provided that will subtract appropriate values from the keys, and allow all addresses to be used. In a simple case the keys might follow the sequence

0001-0103  
0121-0244  
0443-0480

and so on. If addresses were available from disc sector 000070, and each sector could hold a single record, the address of a record would be determined as shown in Table 1.

Such an allocation arrangement is very useful for cases in which runs of keys occur naturally. However, it involves both

the provision of comparison values, and a lengthy analysis of each input key. In principle it could always be arranged, but in practice the technique is limited by availability of storage space or the need to take account of constant changes in key sequence. Thus it is only useful if the file is relatively static and gaps in the key sequence are few, that is, hundreds at the most.

Whenever it is possible to link the address and key of a record directly and so provide a self-indexing file, both direct and sequential reference is possible without any waste of time. However, some key sequences have too many gaps to be handled in this way, or are unsuitable

IF KEY < 103, ADDRESS = KEY + 869  
IF 121 < KEY < 244, ADDRESS = KEY + 882  
IF 443 < KEY < 480, ADDRESS = KEY + 853

Table 1. Determining the address of a record in a disc sector.

because they contain alphabetic or special characters. In this case some other method of linking the key and address is needed.

Keys may be very wide in range, and the objective is to fit them into a set of addresses that provides enough space for all the records, without very many empty positions (10% to 20% may be acceptable). The process is shown in Diagram 1. Two approaches to this are possible;

the first is to spread the records over the available addresses at random. The second is to use any order, usually groups or runs of keys to allocate them more effectively. The allocation calculation is called an algorithm. Many types of algorithm have been investigated but we shall only look at the two most useful techniques here.

Truly random allocation of records is often achieved by squaring the key, or a part of it, and using some digits from the square (usually the centre digits) as an address. The figure will usually have to be adjusted in some way, as it will be in the form  $2^n$  or  $10^n$ , while the required address range might be any size.

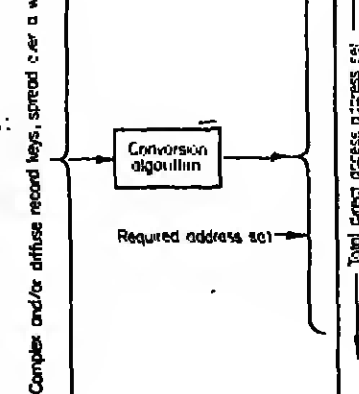


Diagram 1. Fitting keys into a set of addresses without leaving too many empty positions.

and subsequent records allocated to this address will have to be stored elsewhere. They are called synonyms.

It is virtually impossible to find an algorithm that does not produce synonyms. Helsing<sup>2</sup> quotes the probability of finding such an algorithm, in allocating 4,000 records to 5,000 addresses, as 1 in  $10^{12000}$ . However, sometimes the order in the keys (usually runs of records) allow

us to reduce the number of synonyms below the 'random' percentage.

The value of the key by a particular number or an odd number will always be 10% (eg, not 1000001), and use of a remainder as an address, which gives a very good distribution of records. The advantage of this method is that runs of keys will produce remainders that do not lead to synonyms; they differ by one from each other. However, if two sequences overlap, large numbers of synonyms can be caused. It will be discussed in detail later.

The technique also allows a number of addresses allocated to be 'fitted' easily to the number of records by a suitable choice of divisor; division by N will produce remainders in the range 0-(N-1), and the only further adjustment needed is to skip constant 1 if the available space on disc does not start at address 0.

These two techniques are widely used, and give good results. However, synonyms cause wasted time, as the address calculated leads only to the home address, and a further search is needed to find the required record. Thus the designer aims to reduce both number and the effect of synonyms to a minimum. Ways in which this is done will be discussed in future parts.

## REFERENCES

1. Structured Information File: Kalmann, Publ. by the Publishing Corporation, 1973.
2. Note on Random Address Techniques, W. P. Helsing, Systems Journal, Vol 1, 1963, 112-118.
3. File Organization and Accessing, Werner Buchholz, IBM Systems Journal Vol 2, 1957, 165-171.

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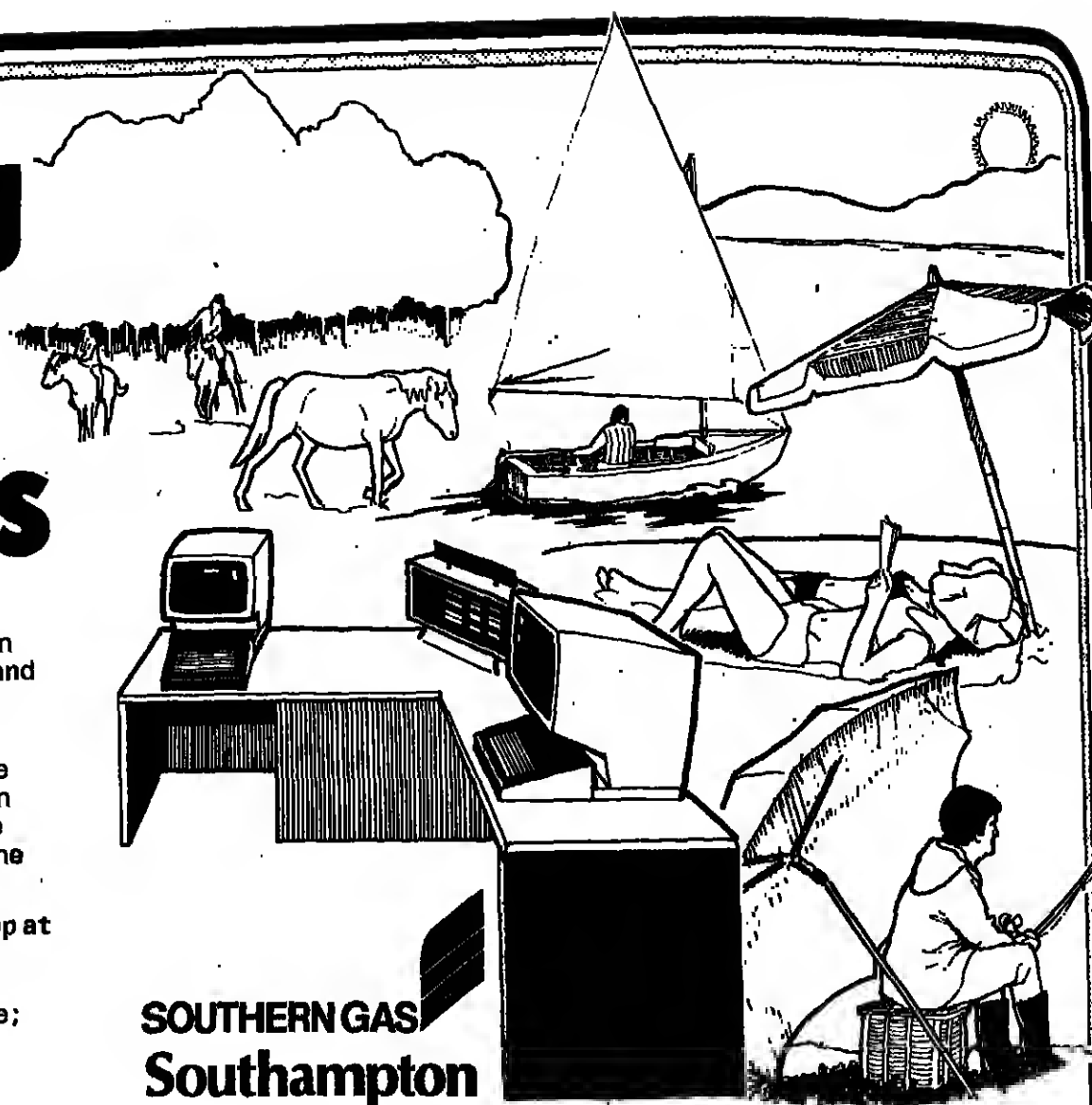
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Opportunities are available for people who have had at least 3 years' COBOL or PL/I experience plus some involvement in systems analysis and/or design.

The scope of the work extends across both the systems development and the operations support areas. It ranges from sole responsibility for the analysis, programming and implementation of enhancements to existing systems, through to a defined role in a major development team working on real-time systems.

Various levels of responsibility exist in these areas dependent upon experience.

## PROGRAMMERS to £8075

If you have upwards of 2 years' programming experience in either COBOL or PL/I and are looking for responsibility in a challenging environment then we would like to hear from you.

You could either join a team within the Operations Group supporting and enhancing existing systems, or else be part of a larger development group working on major real-time systems.

Exceptionally well-qualified programmers with supervisory experience are required as Programming Team Leaders on several large projects.

To: Modern Computer Services Limited, FREEPOST, London WC1N 3JY  
Please send me your 'Southern Gas' Information Package.

Name \_\_\_\_\_

Address \_\_\_\_\_

Position \_\_\_\_\_

Tel (work) \_\_\_\_\_ (home) \_\_\_\_\_

# Manchester Engineers Communications

**£7,500**  
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Specialist Computer Recruitment Ltd

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Birmingham 021-236 3781 35-37 Great Charles Street, Queensway, Birmingham B3 3JY  
Manchester 061-833 0427 Blackfriars House, The Parsonage, Manchester M3 2JA

There can be little doubt as to the advantages of working with a world-wide market leader. Our client is just that.

Specialising in the most comprehensive range of network management/multiplexer/modem systems available, they have rapidly captured over 50% of the current private installed UK market. Their service and reputation in support is second to none. Turnover has risen to the current rate of around £20 million per annum.

Such growth has given rise to four key positions; to cover the northern client base.

### SYSTEMS ENGINEERS

With a full understanding of communications systems and network components. Your role will combine pre/post sales support with network design responsibilities. Thus sales empathy will be as important as technical awareness.

### ASSISTANT SYSTEMS ENGINEERS

An opportunity to enter this challenging aspect of the business, where full product and network design training will be provided.

*All positions carry the use of company car, five weeks holidays and free life insurance.*

Interested?

Contact Sheila Bradbury on 061 833 0427 or evenings and weekends (up to 9.00pm) Wilmslow 523823.

# SALES EXECUTIVES

Our client is one of the success stories of the U.K. — the largest supplier of interactive systems in the country.

**c £16,000 + car**  
**Manchester, Sheffield**  
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Well established  
high growth; highly profitable  
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Austin House, Charlotte Street, Manchester 1

Ref. No. DP12



# "Talent, Like Money, Appreciates Unless..."

IBM Specialists £15,000

Informatics, an International Corporation, hardly needs introducing - we have been providing secure, growth-potential opportunities to talented professionals for over 11 years in Britain, the US and Europe and our record for keeping valued personnel is the envy of our competitors. A further planned phase of expansion has created numerous opportunities for IBM-mainframe environment specialists including: Database designers and analysts, on-line applications programmers (CICS, IMS, TOTAL etc.), systems analysts, designers and systems programmers.

We are offering permanent career positions in London and at several of our European offices with the option of a transfer to the U.S. after a suitable settling-in period.

Numerous opportunities also exist for out-of-London based projects, throughout the South East, Midlands and North West England. European based personnel will receive excellent overseas allowances fully reflecting local cost-of-living conditions and in most cases the working environment will

be English. A few positions do however have a language requirement (French or German).

Whilst you probably identify IBM with software packages, these products are only part of a bigger reputation in the industry is that of an established market leader in business applications.

Whilst we are seeking professionals in the grounds it is assumed that they will already be well remunerated. Naturally, are highly motivated and ambitious. The fluid management Informatics provides for a career progression through to the highest levels. The fact that Informatics

does offer top salaries is, in perspective, incidental to the total benefits and opportunities available to our personnel.

You will certainly be involved in rewarding but demanding projects - probably as a member of a small integrated team of professionals working in an autonomous environment with considerable responsibility. You will be expected to contribute new ideas and develop your already considerable skills.

Interviews will be held in London as soon as applications are received and offers will be made without any of the customary and annoying delays. Please telephone me, Karen Whelan (reverse charges accepted) or alternatively send your concise C.V. to:

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**informatics  
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Home Tel No.	Language experience	Present salary
Office Tel No.	<input checked="" type="checkbox"/> Box	<input checked="" type="checkbox"/> £4000-£4500
(if convenient) Age	<input type="checkbox"/> Babbage	<input type="checkbox"/> £4500-£5000
Present Company	<input type="checkbox"/> Intel Assembler	<input type="checkbox"/> £5000-£6000
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Light Sensitive



# NEW!

## SALES EXECUTIVES MIDLANDS and SOUTH EAST

NEW BUSINESS is the life blood of a company. Securing a steady expansion, it is an investment in the future, providing potential for still further growth from the increasing User base.

Our client is a well known and envied British Manufacturer of minicomputers and distributed processing systems with an impressive customer base including numerous "blue chip" Organisations.

They turn over £20 million+ per annum with a continued growth rate of 40%.

To maintain this figure they need FRONT LINE Sales Executives to sell their proven manufacturing control systems to industry.

Full management and technical support is available as are impressive demonstration facilities. With a happy and loyal Client base, on-site presentations are acceptable.

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2. Bureau Services
3. Minicomputers
4. Involved in pre and post Sales Support

### AND WANT

1. Potential earnings of £12K +
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In the first instance contact me, SIMON LEVER, Senior Consultant, ON 021-236 3781 (24 hour answering service) OR at home ON 021-420 1574 (evenings and weekends), OR write to me if you wish.

Your application will be treated in the strictest confidence.

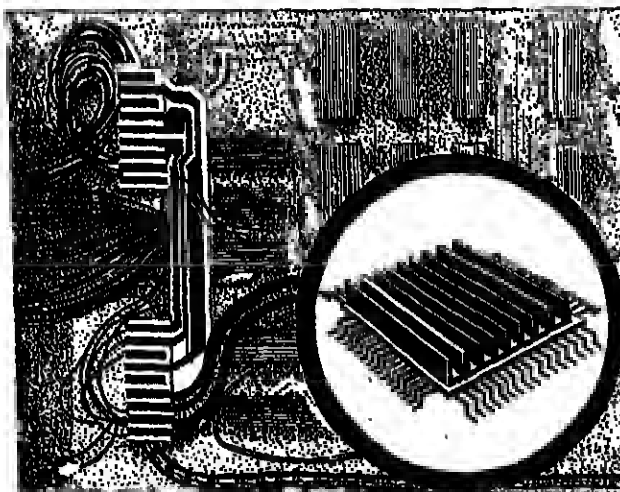


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Specialist Computer Recruitment Ltd



# can you design LSI-logic Creatively?



Recent Graduates c£4,500 Project Leaders c£8,500  
Design Engineers c£6,500 Design Managers c£11,000  
North West - Excellent Relocation Package!

If you are a creative logic designer or microprogrammer interested in LSI technology, these positions offer you a unique chance to be in at the start of an exciting development programme. Our client is an expanding and highly profitable computer manufacturer, now in the initial stages of designing its future range of LSI computer mainframes. The design team will have the best possible working environment in brand new facilities now under construction, incorporating the most advanced design aids.

For all the positions you need a degree and, apart from the graduate vacancies, a background in logic design. The need is for innovative designers, so the length of experience is less important than your creative ability and enthusiasm.

Please contact Neville John on Nantwich (0270) 627 206 (or Farnborough, Kent, 52880 at weekends). Or write to him at - OCC COMPUTER PERSONNEL, 4 Church Lane, Nantwich, Cheshire. (Quoting ref. 200CW)

Initial interviews will be held in London, Nantwich or Manchester.

London office - 16 Bedford Row, London WC1R 4EB



## 3 NEW DEVELOPMENT TEAMS MAIDENHEAD £6,000-£10,000

We have developed the highly successful TRAVICOM airline seat booking, automatic ticket printing and accounting system. Backed by British Airways and British Caledonian Airways, this is an online system offering multi-access airline reservations, ticketing, and accounting to both travel agents and airlines and 200 major travel agencies. TRAVICOM is the world leader in travel automation and we intend to keep it so!

Phase 2 of the development process is now in progress at Maidenhead and we are forming three new teams there to advance the network communications and point of sale features.

We require project managers, team leaders, senior analysts and programmers preferably with DEC RSX-11M or RT11 software, Zilog microprocessor, X25 or other packet switch data communications experience.

We offer the opportunity to participate at the outset in a stimulating project, with unrivalled career prospects, ideal working conditions, international travel opportunities and usual fringe benefits.

Telephone for further details 0628-71817 (evenings and weekends 049-14 3064) or write to:

### Computer Communications Limited

Fleming House, King Street, Maidenhead, Berkshire SL6 1DU

## SOMETHING SPECIAL FOR PROGRAMMERS

CENTRAL LONDON (up to £8750)

There are plenty of run-of-the-mill jobs about, some interesting jobs which are badly paid, and some highly-paid jobs which are nevertheless tedious.

This opportunity is SPECIAL because you will have the chance of learning sophisticated methods (including database and communications) on a large mainframe, using on-line program development techniques, and at the same time enjoy a good earnings package, with sound career prospects.

We are recruiting for clients, a well-organised London installation, and all the work is on-site. We would like to hear from programmers with at least 1½ years' practical experience (for less senior positions), ideally including COBOL. For experienced programmers who have used other languages, retraining will be provided. Team leadership ability will be required for more senior candidates.

Please ring us in confidence for a talk, quoting ref 238CW or leave a message on our answering machine after hours and we will contact you.



EDP SYSTEMS 01.637  
52-53 Margaret St. London W1N 7FF 5796

# JBA

## Technical Author (Electronics)

Italy c.£20,000

A small specialised manufacturing company have now completed the development of a highly complex air-borne system. Incorporated advanced electronics and micro-processor based circuitry. A very experienced Technical Author is required to fully document this system, encompassing operation, technical description, repair and maintenance. Qualifications in electronics are essential together with a background in modern systems design. Position open to freelance contractors for permanent employment. Contact: Mike Creamer

## IMS Project Manager

Birmingham Earnings c.£10,000

An international engineering organisation is seeking a PROJECT MANAGER to formulate the standards and design methodology relating to the use of database technology IMSI at their new data centre. Applicants should be experienced computer professionals and have a thorough knowledge of IMS consolidated by practical experience. A sound opportunity to influence the use of database technology throughout this highly respected organisation. Contact: Bev Stevens

## Software Programmers

Berkshire £6,500 - £10,000

A real chance to join a small dedicated group of mini-computer software development technicians in a computer manufacturing company. The team are involved in the design of data management software, compilers, and related packages, for an increasing range of business orientated machines that are recognised as being among the leading products in this sector of the market. Applicants must have at least two years experience of similar work using advanced techniques. A degree or post-graduate work on system software or compiler architecture would be an advantage. The company offers an attractive employment package, pleasant working environment and the opportunity to assume responsibility for projects within the group concept. Contact: Mike Creamer

## Defence Operational Analysts

Central/S.W. London neg.£6,000 - £9,000

Our client is a scientific systems company in a well established software group. An impressive sales record has generated two vacancies for staff with operational analysis experience to work on projects assessing the performance of naval systems and equipment. Work is at Head Office in Central London and on site in South West London. A good degree in a maritime discipline is essential. Experience of Fortran or COBOL and of Operational Research in Defence would be an advantage. Salaries and benefits are consistent with a group which places real emphasis on career development. Contact: Margaret Stevens

## INSURANCE COMPANY Systems Analysts

South of England

Salaries up to £7,100 + mortgage subsidy + non-contributory pension + free permanent health scheme + low interest loans + subsidised canteen and sports/social club + all relocation expenses + other benefits. A very attractive prospect for career-minded Analysts, keen to progress in a growth-oriented modern company putting in database and TP systems, promising exciting design and development work well into the 1980's. We are keen to hear from Analysts who have a sound business background, a good knowledge of COBOL, and experience of system design over two to three years, ideally in an accounting, financial or banking environment. Contact: Mike Creamer

## Development Programmer

For First-Time Mini User.

Surrey c.£7,000 + bonus

A well established commercial organisation wishes to recruit an Analyst/Programmer to assist with the design and development of their first mini-computer systems. Candidates should have at least three years experience of high level languages in the development of accounting/financial/mark applications. This is a unique opportunity to be the first member of the d.p. function. Contact: Jim Baker

## Programmers

Berkshire up to £7,000

A well established British company specialising in industrial systems has opportunities for Programmers to join the expanding development teams. Candidates, preferably graduates with at least twelve months programming, should have experience of minicomputers in technical, industrial or process control applications. Large company benefits including relocation. Contact: Jim Baker

## Systems Programmer

Rugby up to £7,000

A medium size engineering company has a vacancy for a TECHNICAL SUPPORT PROGRAMMER to join a small team responsible for systems software and to assist in applications programming. Applicants should have a good education with a minimum of 2 years IBM DOS/VS programming experience together with the ambition and ability to work with systems software. An ideal opportunity to develop a career in system software. Contact: Bev Stevens

JAMES BAKER ASSOCIATES,  
International Personnel Consultants,  
32 Savile Row, London W1.  
Tel: 01-439 9311.



**CONSIDER 1980** — What can you foresee for yourself in 1980 and beyond?

- Continued maintenance of existing systems? — A very restricted program of new systems development?
- Predictable and limited personal rewards? — Joie de Vivre?

**CONSIDER MOUNCEY'S 1980 AND BEYOND** (just to name a few)

- Development of a complete, batch and real-time, banking system for an Egyptian Bank based on NCR B585 using VRX, TRAN-PRO, TOTAL.
- Development of a large Order Processing / Distribution System for an overseas client based on ICL 2972, using VME/B, IDH, IDMS.
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- Development of a Personnel Records system on UNIVAC 1100 using DMS 1100.
- Development of Management Information Systems for a multi-national group to operate on IBM 370's using Structured Design and Development Techniques.

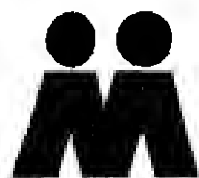
**CONSIDER THE PROSPECTS**

- Working as a Mouncey Team member on new systems development, frequently using advanced technology.
- Challenges both technically and in terms of project responsibilities.
- The potential to work on Overseas projects for both short and longer periods (if that's what you want).

**CONSIDER THE BENEFITS**

- Above average starting salaries — £8000 to £9500 per annum.
- Opportunities now for PROGRAMMERS, SENIOR PROGRAMMERS, ANALYST / PROGRAMMERS, SYSTEMS ANALYSTS.
- A good non-contributory pension and life assurance scheme.
- A choice from 20 new CARS under our car option scheme.
- BUFA for you and your family.
- SIX monthly salary and personal reviews.

Finally **CONSIDER** your position within the context of Mouncey and Partners, which is an established (1962), stable, profitable, well respected and professionally operated Computer Consultancy and Software House. What is most important, to you, is that we are a company that recognises and positively values our staff as our most important asset.

**CONSIDER** telephoning or sending a C.V. to me, **ROD EVANS (DIRECTOR)**

**Mouncey and Partners Limited**  
13/14 Cornwall Terrace  
Regents Park  
London N.W.1

Telephone **01-486 7777**

**TOOTING, LONDON SW17**

Due to internal promotion, the South West Thames Regional Health Authority require additional operations personnel to be based at the Regional Computer Centre, Springfield Hospital, London SW17. Computing, within the centre, is currently based on ICL 1904S hardware, running under George 3, which provides medical, financial and management information to the Region. A two-shift system is currently in operation and, where indicated, the quoted salaries are inclusive of a shift allowance.

**OPERATIONS MANAGER** £7430-£8949

Applicants must have a good working knowledge of ICL 1900 hardware and George 3 coupled with proven managerial experience in a sizeable installation. The successful candidate will be responsible for the management of a 60-strong department comprising operations, data control and data preparation staff.

**CHIEF OPERATOR** £6656-£8083

Reporting to the Operations Manager, the person appointed will be responsible for the efficient day-to-day management of computer room personnel with additional duties in the areas of George 3 optimisation, implementation of new applications plus the introduction and maintenance of operations standards. Applicants should have a solid ICL 1900 and George 3 background with previous supervisory experience.

**SHIFT LEADER** £7042-£8497\*

This post will be of interest to existing Shift Leaders or Senior Operators who already have a thorough knowledge of ICL 1900 hardware and George 3, and who now wish to develop their supervisory skills.

**TRAINEE OPERATOR** £3414-£4388\*

A minimum of 4 'O' levels plus the initiative and ability to work efficiently within a close-knit team are the essential requirements for this position which offers excellent prospects within a go-ahead installation.

**DATA CONTROL CLERK** £3414-£5468\*

Applicants are invited from candidates with a good knowledge of George 3 Job Control Language although applicants without previous computer experience will be considered for a trainee-level appointment.

For further details, phone John Wynton, or write to:

Modem Computer Services Limited, FREEPOST, London WC2N 5BR.

\*Incl. travel allowance.

01-839 3351

**MODEM**  
Up to 8:00pm each evening

**Data Processing Staff Consultants**

LONDON SCHOOL OF  
HYGIENE AND TROPICAL  
MEDICINE  
(University of London)

Keppel Street WC1E 7HT

**APPLICATIONS  
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To join a small group responsible for the provision of computing services to the School. Duties will include implementation, maintenance and support of application packages on a local mini-computer connected to ULCC.

Applicants should be graduates for three equivalent experience or qualifications with a good knowledge of at least 1 programming language, preferably FORTRAN. Experience in the development of large programmes and some knowledge of statistics an advantage. Salary in the range £5,100-£11,100. Applications with qualifications and experience.

Further particulars and application form from F. C. Ball, Assistant Secretary, completed application forms to be returned no later than 13th March, 1980, quoting reference XHL/1.

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to supervise and operate recently installed on-line computer installation with word processing unit.

Particular responsibility for in-house training. Salary by negotiation. Four weeks holiday.

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SYSTEMS ANALYST**

NORTH BURREY TO £8,500

Have you a manufacturing or accounting system background? If you have and you would like to know more about TOPICS the IBM manufacturing systems package give us a call. The company using this on-line system as a pilot scheme soon to be installed world wide, are one of the major manufacturers of home entertainment in the world. Your future career is assured if you have 3 or more years' DP background. CW9/2.

**CONSULTANTS**

CENTRAL LONDON

£8,500 to £14,000  
A large, well-established consultancy with to recruit systems people with all-round experience on third generation equipment and the right personality to deal with clients who require first-rate service. Technical Communications Consultants are also required where in-depth implementation experience of IBM or DEC latest ranges are essential. Excellent fringe benefits and prospects. CW9/3.

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Large 2900 Cobol VME/B London, 3 mins  
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Shadow PU DOS, London 3 mins  
Cobol Total D/B - IBM London 3 mins  
POP Coral 66, Surrey 6 mins  
Level 88 IDS TDS Holland 6 mins  
Cobol IMS OS/VST, France 6 mins  
IBM TSS IDS, Holland 1 hr  
IDMS Sys. Analyst - ICL, Holland 1 hr  
2900 IDMS, Abu Dhabi 6 mins

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01995 3883 (01958 6138 Evenings)  
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# SYSTEMS AND PROGRAMMING

**ANALYST/PROGRAMMERS**

B.W. London

**AROUND £8500**

Flexitime

This well-established manufacturing organisation, with up-to-the-minute hardware, is seeking Analyst/Programmers with 3-5 years' COBOL or GEORGE III. The emphasis is on the development of commercial systems, and there is the opportunity to move into full-time, analyst positions. A progressive salary structure is in operation and career prospects are excellent.

Ref: IM 8/1

**PROGRAMMERS**

City

**AROUND £6000**

Mortgage Facilities

A major international banking organisation can offer interesting work to BASIC and BASIC+ Programmers with around 2 years' experience. A background in financial applications would be useful, but not essential. There are extensive and generous benefits, including mortgage subsidies and non-contributory pensions.

Ref: IM 8/2

**RPG II PROGRAMMER**

Victoria

**AROUND £6000**

Generous Discounts

Our client is a market-leader in consumer products. With the recent installation of a System 34, there is a requirement for an RPG II Programmer with 18-24 months' experience to develop new applications. Excellent benefits include staff discounts, non-contributory pensions and free medical insurance.

Ref: IM 8/3

**PROGRAMMER IBM 370**

Berks

**TO £5500**

1 yrs. exp.

A well-known company in the cosmetics industry seeks a programmer to complement their highly efficient OP department. TRAINING IN PL 1 will be given where necessary. The installation uses transmission links and databases. Excellent career progression is expected for the successful applicant. Relocation expenses will be paid if necessary and the company offers flexitime and discounted products.

Ref: DB 8/4

**PROGRAMMER**

Sucks

**TO £7500**

RPG or Cobol Systems 3 and 34.

A household named company is seeking a competent RPG or possibly COBOL programmer. Retraining will be given if necessary, one year's experience is expected. The company offers 22 days' holiday, a heavily subsidised canteen and discounted group products.

Ref: DB 8/5

**PROGRAMMERS AND REAL TIME  
PROGS**

Hampshire and London

**£NEG.**

This leading consultancy seeks programmers with at least 2½ years' experience. The company has several different machines and uses a multiplicity of languages for both scientific and commercial applications. Comprehensive company benefits including relocation if necessary. This is a real opportunity to expand your range of machines, languages and applications. High-calibre applicants are expected.

Ref: DB 8/6

# OPERATIONS

**OPERATIONS SUPERVISOR**

Responsible for daily running of Burroughs mini-system and organising staff at small site in Oxfordshire. Days only.

**£5000**

**HARRIS SENIOR OP.**

2 year's experience on any machine to work 2-shift system in S.W. London.

**£5400**

**OPERATIONS MANAGER**

Large companies in London and Home Counties, using Burroughs medium systems require management staff with at least 6 years' experience. Bonolite include car.

**TO £10000**

**DEC - POP OPS**

Minimum 1 year's experience required by various sites in Central London. Various shift patterns.

**£4500**

**DEC - POP OPERATOR**

Minimum 18 months' experience required by installation in Central London. Days only.

**£4400**

**DATA CONTROL**

Many data control vacancies in London and Home Counties for clerks and supervisors. Days and Shifts.

**to £5800**

**IBM/ICL OPERATOR**

Chance to switch to IBM for experienced ICL G11 operator North London location.

**£4500**

**ICL 18/2800 OME/B VME/S OPERATOR**

N. London based installation, require experienced operators, will look at good G11

**£5500**

**UNIVAC 80/30 OS3 SENIOR OP**

Established installation in City offer top perks + pay for very experienced OS3 operator. 2 yrs. + experience required.

**£9000**

**ICL 1900 SHIFT LDR.**

City based company require S/ldr. with 3 yrs. JCL + ops experience. Excellent perks.

**£6500**

**ICL 2800 VME/B OPERATOR**

City installation requires 18 months' experience in VME/B & Sys. 4. Excellent chance to gain latest ICL software experience.

**£5200**

**ICL 2903/4 SENIOR OP**

Small, but needs reliable OP to take heavy responsibility!

**£5000**

**IBM 370 OS OPS SUPT**

Supervisor required for team of 4. Sound operating background plus 3 years' in Ops Support or similar role, which should include JCL writing.

**£7500**

**IBM 3031 OS OPERATOR**

Large South London Co. require an operator with approx. 1 year IBM OS Operating experience. Good perks and prospects.

**£5200**

**IBM 370 OS OPERATOR**

1 year plus experience required by progressive North London site. Perks include Mortgage subsidy. Prospects of Programming in the future.

**£5500**

**IBM 370 DOS SENIOR OP**

C. London Financial site require an operator with 18 months' plus experience, including some knowledge of JCL utilities. Full banking perks offered.

**£5700**

**IBM 3031 DOS SHIFT LDR.**

2 yrs. + OOS experience with some JCL and supervisory experience of 2 shift working. London installation.

**£5600**

**IBM 370 DOS OPERATOR**

North London site require an operator with 6 months' plus DOS experience. Unusual shift pattern working mainly days only.

**£4700**

Datascene International Limited,  
Sceptre House,  
169-173 Regent Street,  
London W1R 7FB. Telex: 25851

**datascene**

**01-439 7871**  
24 hour answer phone: 06 261 1111



## Informal Interviews

**Marble Arch**  
CUMBERLAND HOTEL,  
DORSET SUITE,  
Marble Arch, London W.1.

12 Noon till 8.30 pm.  
Monday 3rd March 1980



### Development Staff Up to £8600 Computer Centre Staff Up to £7900

Salaries under review

By walking in to our Informal Interviews next week you'll be taking an important step in your career while helping us to make an important step at our development.

At Southwark our Computer Services Division is entering the ambitious second phase of its growth. We have expanded our ICL 2970 hardware and wish to strengthen our systems and Computer Centre functions and so shall be looking for:

#### Systems Development

Project Leaders  
Analysts and Programmers  
Computer Centre  
Operations Manager  
Operations and Control Staff

We have a progressive training policy that will keep you in touch with the latest techniques and we provide good salaries (with overtime rates) and a wide range of benefits. But why not take the first step by calling in to our Informal Interviews, we promise you won't look back.

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Telephone 01-701 2870 any time for an application form, or write on a postcard to: The Personnel Office, London Borough of Southwark, 27 Pockham Road, London SE5 8UB. Please quote reference: CW8/1179 and job title.

**Southwark**

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### A revolution in design, systems, applications and procurement

The switch from a traditional electro-mechanical base to advanced electronics is the task our client is now facing.

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For digital design, standards, ATE, manufacture and quality.

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Previous design experience in a commercial organization is preferred and familiarity with Assembler languages, Z80 and Intel family would be useful. Qualifications to degree/HNC level will be expected and successful candidates will probably be aged 30 years plus.

The attractive remuneration package for these Reading based positions will include five weeks annual leave and membership of an excellent contributory pension scheme with free life assurance. Relocation assistance will be offered where appropriate.

Write to, or ring:  
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Racal-Milgo Limited,  
Richmond Court, 309 Fleet Road, Fleet, Hants.  
Tel: (02514) 22144

### LIVERPOOL AREA

#### ANALYSTS

(DR/853) 18 + months IBM experience to £6500  
(DR/854) 24 + months IBM ICL background to £7500  
(DR/855) 24 + months ICL environment to £7000  
(DR/856) Senior Analyst ICL environment c £7000  
(DR/857) 24 + months IBM experience to £6500  
(DR/858) 18 + months ICL experience to £6000  
(DR/859) 18 + months IBM background to £6400  
(DR/860) 24 + months ICL experience to £6500  
(DR/861) 18 + months ICL oriented to £6000  
(DR/862) 24 + months IBM environment to £6300  
(DR/863) 18 + months IBM orientated c £6000  
(DR/864) 24 + months IBM (CICS) c £6500  
(DR/865) Firm ICL background c £6500  
(DR/866) Firm experience (any mainframe) c £6500  
(DR/867) Firm IBM background c £6000

#### PROGRAMMERS

(DR/868) 18 + months IBM CICS experience c £6000  
(DR/869) Firm IBM CDBOL/ASSEMBLER to £6500  
(DR/870) 12 + months ICL COBOL to £5200  
(DR/871) 18 + months IBM experience to £6000  
(DR/872) 18 + months ICL CDBOL to £5400  
(DR/873) 24 + months IBM/ICL CDBOL to £7000  
(DR/874) 24 + months senior ICL position to £7800  
(DR/875) 24 + months ICL COBOL to £6000  
(DR/876) Senior Programmer IBM environment to £6400  
(DR/877) 12 + months IBM COBOL to £5500  
(DR/878) 18 + months IBM CDBOL to £6500  
(DR/879) 18 + months large mainframe (CDBOL) to £6000  
(DR/880) 18 + months ICL COBOL c £5300

### MANCHESTER AREA

#### ANALYSTS

(DR/881) 12 + months any mainframe to £5300  
(DR/882) 24 + months ICL environment to £6200  
(DR/883) 24 + months IBM background to £7000  
(DR/884) Firm ICL background (degree required) £ Neg.  
(DR/885) 18 + months IBM environment to £6500  
(DR/886) 24 + months ICL background to £6500  
(DR/887) Sales support (will travel) to £7500  
(DR/888) IBM background to £6000  
(DR/889) 18 + months mini background £ Neg.  
(DR/890) Experienced IBM analysts to £7000  
(DR/891) Senior IBM positions to £7800  
(DR/892) Experienced analysts (any mainframe) to £7000  
(DR/893) ICL background to £6400  
(DR/894) 20 + months any background to £6000  
(DR/895) 18 + months IBM environment to £5500

#### PROGRAMMERS

(DR/896) Senior position IBM COBOL/ASSEMBLER to £7000  
(DR/897) 12 + months ICL COBOL £ Neg.  
(DR/898) 18 + months IBM systems experience to £7000  
(DR/899) 24 + months ICL environment c £5500  
(DR/900) Sales support (will travel) to £7000  
(DR/901) 3 + years IBM COBOL/ASSEMBLER to £7000  
(DR/902) 24 + months ICL COBOL £ Neg.  
(DR/903) Senior IBM positions to £8000  
(DR/904) IBM assembly position to £5500  
(DR/905) 18 + months any mainframe £ Neg.  
(DR/906) 18 + months COBOL c £5500  
(DR/907) 12 + months ICL CDBOL c £4700  
(DR/908) Experienced IBM CDBOL/ASSEMBLER c £6000

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YRS ANALYSIS \_\_\_\_\_ YRS PROGRAMMING \_\_\_\_\_  
MACHINES USED \_\_\_\_\_  
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(DR/700) 4 + years (including programming background) c £7000  
(DR/710) 2 + years financial systems - IBM site to £7000  
(DR/711) 2 + years commercial systems c £6500  
(DR/712) 18 + months (plus programming background) to £6500  
(DR/713) 2 + years financial systems (including programming background) to £7500  
(DR/714) 2 + years (including ASSEMBLER programming background) to £7500  
(DR/715) 2 + years commercial systems (with programming background) £ Neg.  
(DR/716) 3 + years manufacturing systems c £7000

#### PROGRAMMERS

(DR/717) 2 + years COBOL c £6000  
(DR/718) 12 + months IBM COBOL £ Neg.  
(DR/719) 2 + years COBOL on any mainframe c £5500  
(DR/720) All levels PDP BASIC to £6000  
(DR/721) 18 + months ICL COBOL - 2900 site to £6500  
(DR/722) 12 + months COBOL on any hardware to £6500  
(DR/723) 2 + years NCR COBOL £ Neg.  
(DR/724) 3 + years COBOL supervising - ICL site to £6500  
(DR/725) 2 + years ICL COBOL c £6500  
(DR/726) 18 + months COBOL on any mainframe c £6500  
(DR/727) 2 + years ICL COBOL £ Neg.

### CAMBRIDGESHIRE AREA

#### ANALYSTS

(DR/728) 3 + years Project leader, commercial systems to £9000  
(DR/729) 3 years database design + administration to £9000  
(DR/730) 2 + years commercial plus major projects experience to £8000  
(DR/731) 18 + months (all data processing background) to £7000

#### PROGRAMMERS

(DR/732) 2 + years systems programme PL/1, CICS, DDS to £8000  
(DR/733) 1 year minimum - all grades PL/1, or CDBOL to £6000

### TYNE & WEAR AREA

#### ANALYSTS

(DR/734) 18 + months commercial systems to £6500  
(DR/735) 2 + years financial systems to £7250  
(DR/736) 3 + years manufacturing systems c £7500  
(DR/737) 2 + years (including COBOL programming background) c £6800  
(DR/738) 3 + years manufacturing systems £ Neg.  
(DR/739) 4 + years manufacturing systems to £8500  
(DR/740) 2 + years production systems to £7800  
(DR/741) 2 + years (including programming background) c £7000

#### PROGRAMMERS

(DR/742) 2 + years COBOL on any hardware c £5500  
(DR/743) 12 + months IBM COBOL £ Neg.  
(DR/744) 3 + years PL/1 c £6500  
(DR/745) 2 + years IBM COBOL to £6500  
(DR/746) 3 + years ICL CDBOL c £6000

### GLASGOW & WEST OF SCOTLAND AREA

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(DR/747) 3 + years financial systems to £7500  
(DR/748) 3 + years manufacturing c £7000  
(DR/749) 2 years commercial systems to £6800  
(DR/750) 2 years IBM preferred to £6500  
(DR/751) 2 + years analyst programming any machine c £6300  
(DR/752) 3 years general commercial systems c £6800  
(DR/753) 18 months analyst programming to £6000

#### PROGRAMMERS

(DR/754) 3 + years IBM systems programming c £7600  
(DR/755) 4 + years CICS, DL/I to £8500  
(DR/756) 2 years IBM 370 systems programming c £6500  
(DR/757) 3 + years COBOL, any hardware c £7000  
(DR/758) 3 years COBOL, any mainframe to £6750  
(DR/759) 3 + years COBOL IBM preferred to £7250  
(DR/760) 18 + months COBOL, IBM, ICL c £6600  
(DR/761) 3 + years PL/1 c £7760  
(DR/762) 2 + years IBM COBOL £ Neg.

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at Board Headquarters,  
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Salary up to £6660 per annum.

Programmers with sound programming ability in COBOL, FORTRAN, Basic Assembler languages interested in systems programming.

The successful applicants will be required to work in small teams with responsibilities for Operating Systems, Data Administration and the development of utility programs and routines.

Relevant training in operating systems or database software will be given.

Initial salaries will be based on experience and will be supported by attractive fringe benefits.

Applications should be made on a form obtainable from the Personnel Manager, The East Midlands Electricity Board, P.O. Box 4, North, P.O. 388 Coppice Road, Arnold, Nottingham NG5 7HX, and returned by Friday, 14 March 1980.

**WORKELECTRIC**

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#### Computing Service COMPUTER OPERATOR

Applications are invited for the post of Computer Operator.

The Computing Service is based on a PDP-10 with 512K of main store, disc and mag tape. A wide range of software is available for users.

The computer is currently maintained from Monday to Friday on a three-shift basis during term time and two shifts during vacations.

Previous experience, though useful, is not necessary as full training will be given. This is a good opportunity for anyone who wants to get into computing and career development is encouraged.

Salary scale £2674.64 rising to £3568.94 plus shift allowance.

Further information from the Head of the Computing Service, The Polytechnic of North London, Holloway Road, London N7 8DB.

If you are aged 18 months plus at present on George 3 contact us now! Vacancies in London and elsewhere.

Also contact G3 Data Control, Clive Lister, Contact Dept on 281-8888.

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# Britain's Computer peripherals industry is taking off.

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At last a British company is making the massive investment needed to compete with the world-leaders in the manufacture and supply of peripherals. Our client, based in the Home Counties, has a remarkably successful record in this field and is now re-organising so that the company is geared up for competitiveness on a world-scale.

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This expert man-manager will also have both business sense and considerable technical skill, enabling him to understand and help solve sales problems. Supervising a team of up to 15 engineers, the Manager will be responsible for the successful implementation of disc products as well as their service and support.

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A computer expert with total system knowhow for the above team.

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An ideal opportunity for someone in a Business Equipment environment to develop into the computer business, servicing standard teletype compatible printers.

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As well as training the staff of the company and its clients, this experienced Manager will be responsible for setting up 4-5 Regional Field Training Centres completely from scratch. It will demand considerable imagination from someone prepared for a constant influx of a new ideas.

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Starting salary within the range of £3881-£4975 p.a. (inc.) depending on age and experience. Applications giving age, qualifications and previous employment to: MR. P. M. BLACK, UNIVERSITY OF LONDON COMPUTER CENTRE, 26 GUILDFOUR STREET, LONDON, W.C.1. Tel: 01-408 8400.

## MICRO-PROCESSOR APPLICATIONS

Additional personnel are required to work in a small team on the development of micro-processor applications in the amusement industry. Both hardware and software expertise is required, preferably with INTEL products. Preference will be given to applicants with experience of the techniques employed in inter-connecting a number of remote processors to a central micro or mini computer.

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A major manufacturing and marketing organisation based in Bracknell is seeking a Systems Programmer with 2 years DOS/VS and a solid commercial applications background utilising PL/1 or Assembler.

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### LECTURER

in the above Department. Preference will be given to candidates with special interests in DATA PROCESSING, MICRO TECHNOLOGY or SOFTWARE ENGINEERING. Candidates should have a good honours degree or equivalent qualification. Salary in scale for lecturers £5052-£10131 (from 1 April 1980), depending on age, qualifications and experience.

Application forms and further particulars may be obtained from the Registrar, The University, Leeds LS2 9JT, quoting reference number 48/26/AZ. Closing date for applications 30 April 1980.

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has responsibility for projects in the areas of information systems for command and control, rail packet switched data communications systems. This includes project WAVE, for which contracts for the main development and production phases have recently been awarded to PDS. It also includes Plessey activities related to command and control for the Royal Air Force. Current projects and immediate prospects cover a variety of activities ranging from feasibility studies to major system implementations. Prospects are such that a major expansion of the operation is being sought over the next 1 to 2 years. Opportunities exist at a variety of levels in the following skills:

**Software designers/programmers**  
**Systems analysts/designers/engineers**  
**Project management staff**  
**Software quality engineers**  
**Planning engineers**

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- A stimulating working environment, where ability, initiative and achievement are well rewarded.
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write to Peter Steiner, Recruitment Manager, Plessey Defence Systems Limited, Station Road, Addlestone, Weybridge, Surrey.

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## Software Specialists in SHOCK MOVE DRAMA!

### FROM "MEGABYTE"

On the back of rumours that a hush-hush software house has been established in Watford by a very prominent company, (as published in our previous issue) we can now exclusively reveal that the mystery company is about to break cover. Our own enquiries reveal that they have already appointed staff as a result of our previous "leak" and more are yet to be appointed.

### MYSTERY COMPANY NAMED!

In a dawn raid on his home, we confronted David Woolf, the personnel consultant at the centre of this undercover recruitment sweep. "Who is the mystery company?" we asked. "I categorically refuse to confirm or deny that my client is Metcon Space and Defence Systems," he told our correspondent. Not content with this middle-man's answer, we probed further and came up with some surprising information.

**FACT:** Men and women at all levels of expertise, graduates or of graduate calibre, could join this company. Anyone from a control computing environment - gas, electricity, defence, paper, steel, aerospace, chemicals - in fact, anyone using small computers on control, simulation or data analysis and retrieval systems should apply.

**FACT:** More senior applicants will need solid real-time experience and a very strong software engineering background with industrial/scientific applications experience.

**FACT:** The work is far more exciting and challenging than any consultancy operation, with R & D on software, testing, standards and procedures - hardware and software development are handled side by side.

**FACT:** High salaries and excellent career prospects are on offer.

### BEHIND THE FACADE!

Woolf, who expressed fears of being inundated by phone calls from ideal candidates, asked us not to reveal his number... so here it is. Call him today on 0932 652552 (up to 9pm). Demand to know more now. It's your right.

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**The Job:** Working with the Bank's Systems Analyst on converting and developing its software for use on an IBM System 38 computer and end of 1990. Continuing software expansion is expected after conversion and it is felt that the job represents an opportunity for an ambitious RPG programmer to keep at the forefront of the languages' development. The individual will to some extent be responsible for the guidance of a junior programmer.

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Kingsway WC1E 7HT

## APPLICATIONS PROGRAMMER

To join a small group responsible for the provision of computing services to the School. Duties will include implementation, maintenance and support of application packages on a local mini connected to ULCC.

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Further particulars and application form from F. C. Ball, Assistant Secretary, completed application forms to be returned no later than 13th March, 1980, quoting reference XHL/1.

## BOX Nos.

Box number replies should be addressed to

Box No. 1  
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Dorset House  
25 Abchurch Lane  
London EC4N 3DF

## Senior Programmer

up to £6700 (review pending)

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## MIDLANDS VACANCIES NORTH WEST

**WEST BIRMINGHAM ANALYST/PROGRAMMERS** c £5,750  
A major manufacturer is seeking analyst/programmers with a minimum of 2 years COBOL experience who are capable of systems design and program application.

**WALSALL SYSTEMS ANALYST** to £7,000  
Our Client is seeking a competent systems analyst with an accounting background to develop new applications in this and other areas.

**BIRMINGHAM OPERATORS** to £6,000  
A major installation has an urgent need for quality computer operators. You will have at least 3 years experience of IBM 370, 303X or similar hardware.

**WEST BIRMINGHAM PROGRAMMERS** c £4,500  
This company is currently looking for programmers with a minimum of 18 months' COBOL experience. Knowledge of ICL 1900/GEORGE III an added advantage.

**SOLIHULL SOFTWARE PROGRAMMERS** to £8,800  
Due to expansion this ICL installation needs more software programmers. You will have experience of ICL 1900's/GEORGE III or 2800's/VME/B and knowledge of on-line software.

**COVENTRY SYSTEMS ANALYST** to £8,000 + O/T  
A large manufacturing group is seeking analysts with commercial and/or production experience. They offer an excellent working conditions, paid overtime and highly competitive salaries.

**SOLIHULL SYSTEMS ANALYST** to £8,600  
A large ICL 2900 will be installed in the summer, with extensive on-line facilities. We need experienced analysts NOW to develop new applications for this machine.

**WEST BIRMINGHAM SOFTWARE PROGRAMMERS** c £5,750  
This computer centre has an ICL 1904S/GEORGE III going to 2980/OME. They are currently seeking software programmers with the ability to support and maintain its systems software.

**NUNEATON SYSTEMS ANALYST** £7,000 + CAR  
A light engineering company is having an IBM 4331 installed. To support this new configuration they are seeking an analyst with a degree/HNO capable of communicating with management at all levels.

**SOLIHULL PROGRAMMERS** to £7,500  
The imminent installation of an ICL 2980/VME/B has generated a need for further programmers. Ideally you will have knowledge of COBOL, ICL hardware, and on-line techniques.  
Phone PETER GILBERT on LEEDS (0532) 444185 (daytime) or on BRADFORD (0274) 834074 (evening and weekends), or write with brief details to the address below.

**CHESTER SYSTEMS ANALYSTS** £ neg  
Analysts with a proven track record in a production control environment will find a high degree of job interest and satisfaction with our clients. A programming background, especially would be advantageous.

**MANCHESTER ANALYST/PROGRAMMERS** c £7,000  
If you can combine a COBOL programming background with some systems design experience, then our client can offer involvement in the development of on-line and data-base systems on large Honeywell hardware. IOS & TOS an advantage.

**MANCHESTER SYSTEMS CONSULTANT** £6,000 + CAR + BONUS + BENEFITS  
If you have one year's commercial systems experience which entailed a fair degree of user contact, plus a programming background, then a highly professional system's house would be interested in discussing a new and highly rewarding position with you.

**CHESTER PROGRAMMERS** £ neg  
Our clients operate a range of ICL hardware which will shortly be complemented by the addition of an IBM 370. They currently seek a number of COBOL programmers having experience on either hardware, with preferably a production control background. Super opportunity for career development.

**NORTH MANCHESTER PROGRAMMERS** £ neg  
Our client is willing to negotiate a very attractive salary for COBOL programmers with IBM experience under OOS/V/S. Previous on-line and data-base involvement extremely advantageous. Excellent and friendly installation.

**PRESTON SENIOR PROGRAMMERS** to £8,500  
Two years' COBOL programming on any hardware which included some on-line involvement will make you of interest to our client. Best prospects.

**PRESTON SENIOR PROGRAMMER** to £5,900 + BONUS + BENEFITS  
If you have around three years' commercial COBOL programming experience, then you may be the person to join our company at a senior level. Large scale involvement in on-line work plus an excellent salary package. IBM experience preferable.

**MANCHESTER COBOL PROGRAMMERS** c £6,000  
**PLAN/DRIVER PROGRAMMERS** c £7,000  
This major company is undergoing a major expansion and will shortly install an ICL 2980. For the COBOL positions you should have gained good ICL experience preferably with on-line systems. In addition, the company seek PLAN programmers with experience of DRIVER to undertake a communications technical support role.

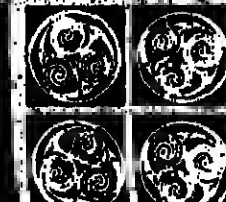
**MERSEYSIDE ANALYST/PROGRAMMERS** to £6,500  
A rapidly expanding systems house has vacancies for analysts/programmers who have had on-line experience on any hardware, preferably IBM. Excellent opportunity for lots of user contact.

**NORTH MANCHESTER SENIOR SYSTEMS ANALYSTS** to £7,500  
**SYSTEMS ANALYSTS** c £6,000  
Our client is looking for experienced analysts with a COBOL programming background, to work on production control applications. ICL background an advantage. Good prospects with a progressive manufacturing company.

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## Micros - London

The Systems Engineering and Software House division of one of the largest computer service organisations in Europe is currently seeking a number of experienced mini/micro engineers to work in a consultancy environment in Central London. Programmers/Engineers should offer 2-3 years of Systems Design using minicomputers or microprocessors, with sound knowledge of Assembler language. You will be involved in the design and development of micro systems for data logging, process control, information retrieval, etc. using Intel, Motorola

and Zilog based microcomputers. Computer science graduates preferred, experience of hardware design would be an advantage but it is not essential. Successful applicants will work closely with clients, either alone or as part of a small project team, and therefore must be able to communicate effectively at all levels. Benefits include incentive bonuses, profit-sharing, etc.

**£6.5 - 8.5K**

## Basic +

Programmers and Systems Analysts, preferably with Basic + and knowledge of DEC hardware, RSTS and RSX-11, required by leading manufacturer of interactive business systems. Opportunities in London and other UK locations. Bonus schemes, car allowances and other benefits.

£6-8K

## Analyst

A Life Assurance company in North West London is seeking a Systems Analyst for the development, support and enhancement of on-line and batch systems. 2+ years analysis experience with knowledge of PL/I and BAL required. Mortgage subsidy & other benefits.

c. £7.5K

## Data Base & Data Comms

UK & Europe

A major American Software Organisation which has built its reputation through Data Base and Teleprocessing Management Systems is expanding its UK and EEC operations, creating opportunities for career-minded and dedicated DB/DC professionals. The requirement is for Applications Programmers, Analyst/Programmers and Systems Analysts with current, or very recent, experience in the implementation and support of Data Base and/or Real-Time systems in a commercial or manufacturing environment. Programmers and Analyst/Programmers should have a minimum of 2 years COBOL, PL/I or BAL.

For the more senior positions, a solid background in Project Planning, Systems Analysis and Structured Programming Techniques is the minimum requirement. These prime positions offer challenge, and provide the financial stability of an established industry leader. Travel or relocation within the EEC will be available to those with the appropriate linguistic skills.

**Salaries in the range £8-18K**

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## Computer Manager

Hotels

EMI Hotels and Restaurants is expanding its computer facility, and in consequence the above position is open to someone who can grow with us. Based at our Tower Hotel, the position reports to the Hotel Director with a functional responsibility to the Divisional Financial Controller.

The successful applicant, together with a small team of programmers and operators will be responsible for controlling our PDP11/55 processors for front of house and bought and sales ledger accounting, but this will shortly be replaced and a new system developed using Honeywell hardware, and our new Computer Manager will be fully involved in this in conjunction with EMI's Group Computer Services Department. It is envisaged that with this development other hotels will come on line and will be fully computerised with integrated reservations, front of house and back of house systems.

Applicants should preferably, though not essentially, have a knowledge of the hotel industry, together with computer systems experience.

Conditions of employment are as one would expect of a major international employer and there are good opportunities for career developments within the THORN EMI Group. A starting salary in the region £8500 to £9000 is envisaged dependent upon experience.

Please telephone for an application form and send detailed c.v. to Mike Cox, Personnel Manager, EMI Hotels and Restaurants Division, 170 Tottenham Court Road, London W1P 0HA. Tel. 01-388 3131 ext. 146.

**EMI HOTELS & RESTAURANTS DIVISION**

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Basic salary (under review) will be on the scale of £4185-£5154 p.a. depending on age and experience, with an inconvenience allowance (18%) additionally paid for three-shift working.

Application forms may be obtained from the Registrar, Surveyor's Department, 5th Floor, 100 King's Road, Reading RG1 1AA. Tel. 01162 55881 ext. 278. Closing date March 31.

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Basic salary (under review) will be on the scale of £4185-£5154 p.a. depending on age and experience, with an inconvenience allowance (18%) additionally paid for three-shift working.

Application forms may be obtained from the Registrar, Surveyor's Department, 5th Floor, 100 King's Road, Reading RG1 1AA. Tel. 01162 55881 ext. 278. Closing date March 31.

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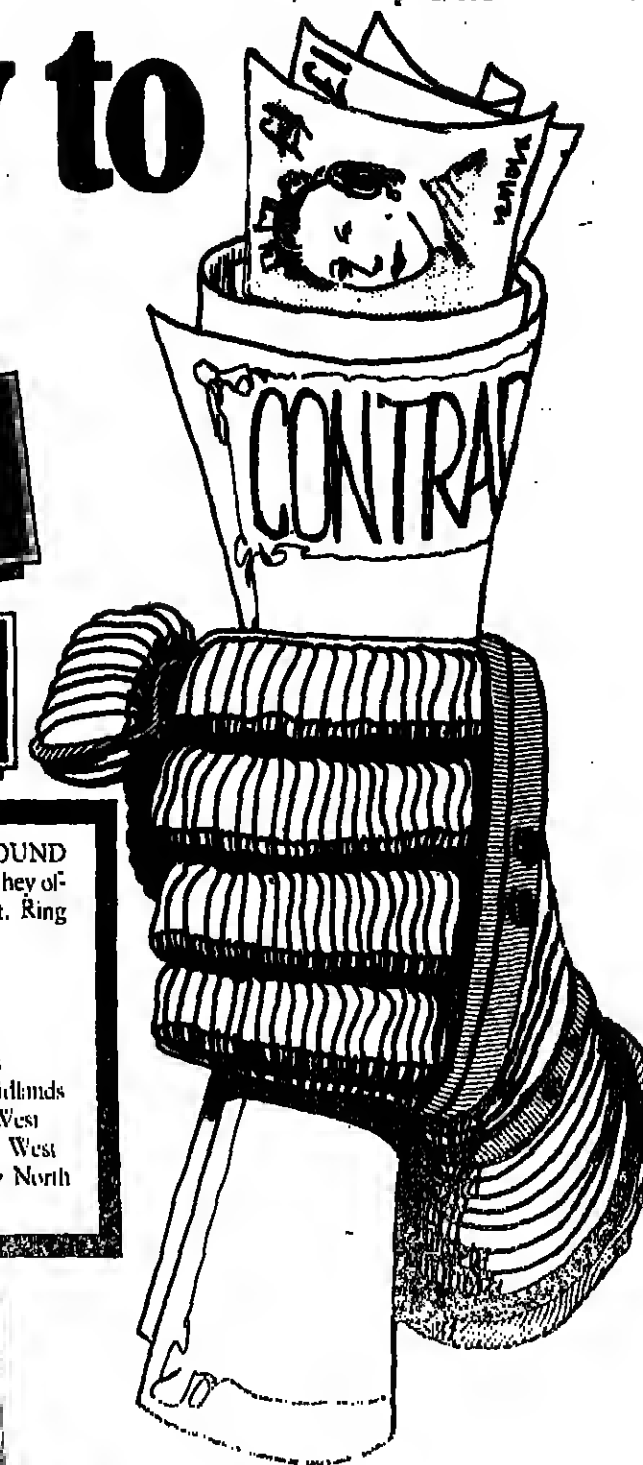
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## Analyst Programmers

c £280 per week North West

How much ON-LINE CICS and TOTAL DATABASE experience have you? You could be the ideal person for our client's IBM 370/148 DOS/VSE and ASSEMBLER set up. A 6 month contract is being offered which is renewable. Ring us now for an immediate start.

c £280 per week Midlands

Why work in a boring place when we're offering a move to an urban/rural fringe of an exciting city. You'd be involved in responsible liaison between branches of our client's concern working on IBM 370/158. It's a conversion from OS/VSE to MVS and it's your chance to be in at the beginning of something big. Ring now for details.

c £270 per week Midlands

How would you like to work on commercial applications with an immediate start? If you have 3 years experience of UNIVAC 90/30, using COBOL and RPGII this one is for you. It's good money for straightforward work.

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ICL 2960 VMEB IDMS COBOL c£280 pw Yorkshire  
IBM CICS, DLI COBOL c£280 pw North West  
COMMERCIAL FORTRAN c£280 pw North West  
ICL 1500 CDE/VTL c£280 pw Midlands

## Programmers

c £300 per week Midlands

How about working on a REALTIME DB system? If you have 2 years IMS experience plus PL/I and ADP, we'll get you in on a chance of an immediate start with a giant company who needs you desperately. It's a 3 month contract and a very popular one so ring us now for details.

c £300 per week Midlands

A large company is looking for you and they are offering fantastic working conditions providing you have 5 years experience in communications/software. To work on PDP11 running under RSX11M programming in RT1.2. This company need you for March/April on an initial 3 month contract. Ring us now for more details of this super opportunity.

c £280 per week North West

Get in at the start of a development project. Your Honeywell level 66 GCOS with IDS/TDS and good COBOL experience makes you just what this company are looking for. You'd be working on commercial applications and an immediate start is offered. Ring now. This really is one of the best chances of getting in on a good thing.

PDP11 DIBOL c£280 pw Midlands  
BASIC PROGRAMMERS c£280 pw Various  
FORTRAN c£280 pw Various  
ICL 1500 VTL/CDE c£280 pw Various  
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**77K PROGRAMMER** N. London  
1-2 yrs experience of RPG II Knowledge of IBM System 34 an advantage

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### SENIOR PROGRAMMER

The progressive and established organization who for many years has applied a specialist computer service to the manufacturing industry is looking for a Senior Programmer to work at their City office. The successful candidate will be responsible for the design and development of new systems and the maintenance of existing ones. He will be required to have a minimum of 5 years' experience in the design and development of systems using COBOL, PL/I, and/or FORTRAN. He will also be responsible for the supervision of junior staff. The successful candidate will be offered a competitive salary and a comprehensive benefits package. Applications should be sent to the Personnel Manager, 100, The Quadrant, London E1 1JL. Ref: C/8021

### PROGRAMMING TEAM LEADER

Large company situated in the City are looking for a programmer who has at least 4 years' experience with COBOL and has led a team of programmers on a project. Relocation or travel experience an advantage. Benefits include a mortgage scheme, non-contributory pension, free lunch and flexible Ref: C/8012

### SENIOR ICL PROGRAMMERS

Major company based in the City are looking for Senior Programmers with at least 3 years' COBOL programming experience, preferably ICL background. Benefits include a mortgage scheme, non-contributory pension, free lunch and flexible Ref: C/8013

### ICL COBOL PROGRAMMER

Programmer working in the City are looking for a programmer who has at least 3 years' experience with COBOL and has led a team of programmers on a project. Relocation or travel experience an advantage. Benefits include a mortgage scheme, non-contributory pension, free lunch and flexible Ref: C/8014

### IBM RPG II PROGRAMMER

Our clients based in London have a vacancy for an RPG II programmer with at least 1 year's experience on the IBM range of machines. The successful candidate will be offered a competitive salary and a comprehensive benefits package. Applications should be sent to the Personnel Manager, 100, The Quadrant, London E1 1JL. Ref: C/8015

### IBM RPG II PROGRAMMER

The fast expanding and well-established organization based in West London is looking for a candidate to join a small programming team. Applicants should have at least 12 months' RPG II programming experience. Benefits include a mortgage scheme, non-contributory pension, free lunch and flexible Ref: C/8016

### PROGRAMMER/ANALYST

A manufacturing company, based in Middlesex, has a requirement for a Programmer/Analyst to join their small DP section. Applicants should have a minimum of 2 years' COBOL experience, preferably gained in a commercial accounting environment. Analysis experience, though desirable, is not essential and planned development work with distributed systems will ensure a high degree of involvement and responsibility. Ref: P/81

### SENIOR PROGRAMMER

A City based organization requires a Programmer with 3 years' COBOL experience, gained in a commercial environment. A knowledge of FORTRAN and communications would be an advantage. Ref: P/82

### SENIOR PROGRAMMER

A large financial organization, based in Central London, is seeking a Senior Programmer with approximately 4 years' experience who has worked on main computer projects, i.e. COBOL, DATA GENERAL. The successful candidate will be offered a competitive salary and a comprehensive benefits package. Applications should be sent to the Personnel Manager, 100, The Quadrant, London E1 1JL. Ref: P/83

### ??? PART-TIME SYSTEMS PROGRAMMER

Our client, a small specialist independent consultancy, wishes to retain the services of a self-motivated freelance IBM RPG II Systems Programmer. For more detailed information contact Robert Lovelady.

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Several years' Programming experience. Minis and Mainframes.  
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Software House - Programming background. Commercial packages.  
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**C.£6,500 ANALYST**  
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2/2 years' Software/Technical Support. Honeywell GCOS.  
**To £8,000 BUSINESS ANALYST**  
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## EAST MIDLANDS

**To £7,000 PROGRAMMER**  
1 year + Cobol experience. Manufacturing environment.  
**£Negotiable SYSTEMS ANALYST**  
Minimum 2 years' Analysis experience. Commercial background.  
**To £6,500 ANALYST/PROGRAMMER**  
At least 2 years' Analysis experience. Knowledge of Cobol.  
**£Negotiable PL1 PROGRAMMER**  
Must have PL1 experience. Manufacturing environment.  
**£Negotiable SYSTEMS ANALYST**  
At least 3 years' Analysis experience. Product Support area.  
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## CAMBRIDGESHIRE

Our client, a major British company located in a very pleasant part of England, is embarking on a major programme of extensive new systems developments.

The applications areas are wide and cover all aspects of general financial and commercial systems together with the creation of an order entry system.

The existing IBM mainframe will be replaced later this year by a 4341 configuration which will utilise the latest on-line and database software. A distributed data processing network using 8100 equipment is currently under development.

Our client seeks to recruit a number of systems analysts at salaries in line with the indicators shown. In addition, relocation expenses to an area of reasonably priced housing will be reimbursed and a bridging loan facility is available to suitable applicants.

## TEAM LEADERS

Candidates for these positions must have a number of years experience in developing practical cost effective commercial systems. A good technical background is important, preferably including on-line and database experience, as is a practical understanding of business systems problems from the users point of view. It is essential that candidates are able to demonstrate a successful record not only in implementing several major projects but in carrying the full responsibility for those projects. (Ref CW/8022)

## SENIOR SYSTEMS ANALYSTS

These positions should appeal to applicants who have at least two years experience of systems analysis, design and implementation of major commercial systems. Past achievement should include a significant role in the implementation of at least one major systems project from feasibility study to completion of the implementation phase. Technical requirements should preferably include some experience of database and on-line systems and a programming or O & M background would be useful. (Ref CW/8023)

## SYSTEMS ANALYSTS

These positions will offer ambitious analysts every opportunity to broaden their experience in a positive and dynamic data processing department where the accent is firmly placed on the successful achievements of an ambitious programme of systems redevelopment. Candidates must have at least 18 months' systems analysis experience preceded by a period in programming, O & M or in a user environment. Applications areas of interest are general commercial, stock control and order entry. (Ref CW/8024)

Interested candidates are invited to contact Roger Pickin by telephone or in writing via the Harrogate office or evenings and weekends at Matlock (0629) 2609 to arrange a confidential discussion.

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Barclays National Bank, the major banking force in South Africa, is on the threshold of building one of the largest computer networks in the world. This includes the development of new on-line financial systems for our large central mainframes, and a distributed processing system to service our 500+ branches throughout the vast expanse of the country. This will involve linking intelligent terminal systems and regional mainframes through an independent packet switched network.

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### and for delivery this year:

IBM 2 x 3033N • ICL 2936 (multiple installations) • CDC CYBER 18 30.

At Barclays, we are committed to total career development, scientific training and the use of the latest techniques. We offer you the excitement of working overseas whilst enjoying the security provided by a large multinational banking organization.

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- \* Cost of living and taxation lower than most western countries.
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- \* Game parks, breathtaking scenery and tropical beaches.
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- \* Excellent recreational and shopping facilities.

### Data Comms.

#### Network Designers

To £16,500 p.a.\*

With experience in the design and implementation of large networks with distributed intelligence. Experience of interfacing with manufacturers in the development of network software is essential. ICL, IBM or CDC experience will be an added advantage. The person appointed will specify and design network requirements, control procedures and terminal/mainframe interfaces.

#### Sizing Expert

To £16,500 p.a.\*

With experience in the mathematical sizing of large networks with distributed intelligence. ICL, IBM or CDC experience will be beneficial as will familiarity with the use of computer packages for network simulation. Duties will include sizing of the total on-line system, from terminal to mainframe.

#### Senior Terminal Systems Designer

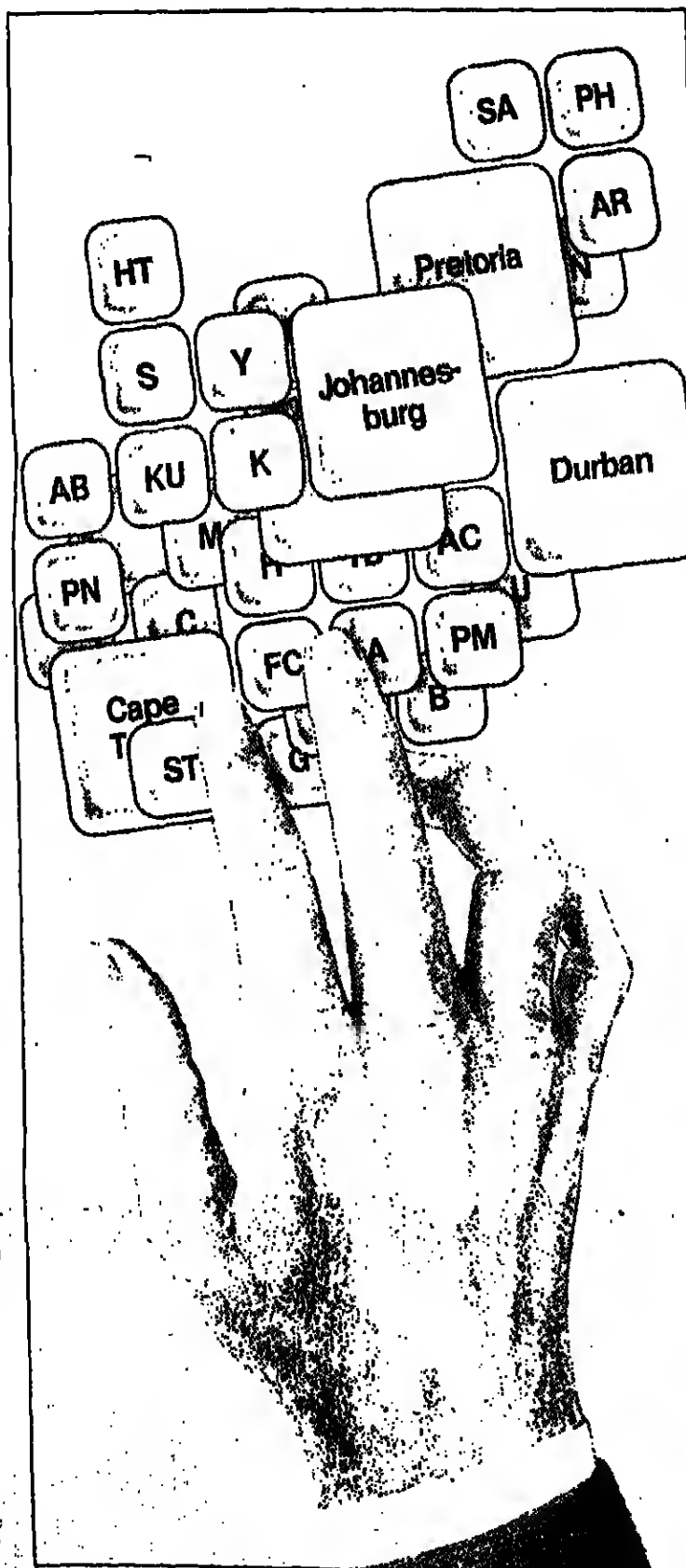
To £16,500 p.a.

With experience of terminal systems design in several different projects, knowledge of distributed intelligence systems and terminal programming techniques. Experience of large financial/accounting systems would be an advantage. The person appointed will be involved in the production of the functional specification of batch terminal systems, specification of the network interface software, systems design and creation of testing facilities.

#### Senior Designer — Integration Testing

To £16,500 p.a.\*

With analysis experience and the ability to lead a project team. Further experience must include the implementation of at least one major on-line system and the testing of large on-line systems. The successful candidate



An equivalent network in Europe would have to link Bristol, Edinburgh, London, Berlin, Paris, Rome, Madrid and Lisbon.

will monitor unit testing of all systems components, develop strategic integration and systems testing, create testing aids and control integrals testing.

#### Senior On-Line Application Designers

To £16,500 p.a.\*

With design experience of several different on-line applications and involvement in the implementation of at least one major on-line project. An essential requirement will be experience of distributed intelligence systems and large financial/accounting applications. Duties include development of data entry, enquiry and report transmission applications, control and co-ordination of programming effort and unit testing.

#### Senior Systems Analysts/Systems Analysts

To £11,500 p.a.\*

With a proven record in Systems Analysis using advanced techniques. You will be responsible for the development of sophisticated financial systems on large mainframes. Persons at senior level will lead project teams.

#### Senior Systems Designers/Systems Designers

To £11,500 p.a.\*

With experience of the designing of systems and the co-ordination of programmer effort. You will be responsible for the building of sophisticated systems utilizing the latest techniques, with the option of either IBM or ICL large mainframes.

#### Senior Programmers

To £10,000 p.a.\*

With COBOL experience. Knowledge of IBM ASSEMBLER will be an advantage. Responsibilities will encompass the production of design specifications. Candidates must be prepared to use the latest techniques and work to standards.

\*All salaries have been converted at the exchange rate of £1 = R1.81 (29.1.80).

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- \* Free air passages
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#### To apply:

Our recruiting team from South Africa will arrive in London on 1st March to conduct interviews. Please write with full career details to Steve Hoar, Barclays National Bank, 152 Upper Thames Street, London EC4A 3DF or phone him for an application form at 01-626 0588, ext. 8158.

## South Manchester to £6000 1980's The Decade of Advancement Systems Analyst

Would you like a slice of the action? Our client, a leading manufacturing company seeks to recruit a Systems Analyst, preferably with about two years experience. A Programming background is not necessary but would be useful.

You will have responsibility for the installation and running of a high powered mini computer with planned teleprocessing links to other sites in the North West. The systems planned for implementation are financial, stock and production applications, previous experience in any of these would be an advantage.

Candidates for this position should be self-motivated and capable of taking responsibilities. The successful applicant will be an out-going person who communicates easily at all levels and will assume responsibility for all user contact and education.

Because this is a position with a large international company all the usual 'big company' benefits apply and prospects for advancement are excellent. If this sounds like the type of challenge you need to start the 80's, then telephone or write now.

Please telephone (24 hour answer service) or write to apply Quote Ref: CW108-MG.

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COMPUTER LABORATORY

### SHIFT LEADER

To control basic team of five operators operating the University's Central ICL 1906S System under GEORGE IV on a three-shift basis. Duties also include operating an ICL 2904 and several CTL systems. The successful candidate will have had at least three years' experience of GEORGE III/IV, with proven ability at controlling other operators staff. Basic salary (under review) will be on the scale of £188-£154 p.a. depending on age and experience, with an inconspicuous allowance (19%) additionally paid for three-shift working. Application forms may be obtained from the Registrar, The University, P.O. Box 147, Liverpool L69 3JX, Tel. 051/831/CW.

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## NEXT WEEK

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Advertisers are reminded that the next Computer Weekly free feature will be published on March 6th and will highlight career opportunities in the North.

Space reservations should be made as soon as possible to:

Owan Kelly — Manchester — 061-872 4211  
Mark Pulver — London — 01-261 8097

Copy Deadline PM Friday before

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## SOFTWARE DEVELOPMENT MANAGER

This position presents an outstanding opportunity for either a Departmental Programming Manager with a technical background or a person experienced in Systems Programming, to take responsibility for an expanding Software Development Team.

Joining a specialist group, the Software Development Manager will lead small teams developing a range of software products on IBM 370 and 4331 equipment.

This position offers an ideal opportunity for a SENIOR SYSTEMS PROGRAMMER who is seeking a positive career advancement into management whilst retaining a full technical involvement.

## THAMES VALLEY

Liaising closely with technical support and marketing personnel to interpret and define future requirements, the successful candidate will contribute to the design of products in addition to identifying improvement potential in existing systems.

Candidates for this challenging role will have a strong IBM ASSEMBLER background, preferably gained at a DOS/VSE installation, and possess the personality to motivate and control a fast growing staff of technicians.

To cope with the ever-increasing demand for its products and to maintain its leading position in the software field, the Company has ambitious expansion plans, thus presenting the person appointed with considerable scope for career progression. A good starting salary is further enhanced by a company car and first-class conditions of employment, including generous relocation expenses where appropriate.

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REF. S1/2802

## IBM 4341 VM DOS/VSE DB/DC COBOL APL

In order to maximise the benefits of computers in local government, a significant expansion of the computer function has just been approved and a new organisation structure has been created to assist in running the computer installation and developing new projects in the 80s.

An IBM 370/138 is currently installed and operates under DOS/VSE and SHADOW II to provide both a batch and teleprocessing service. The processor is due to be replaced this Summer by an IBM 4341 operating under VM and DOS/VSE. Significant development is planned using data base and teleprocessing techniques.

All posts are open to men and women.

Generous relocation allowances are available to appropriate candidates

Appropriate training will be given where necessary.

Starting salaries would depend upon qualifications and experience.

Written applications should be sent to the Computer Manager, Gerald McDonough, P.O. Box 21, Civic Centre, Harrow, Middx

For further information and informal discussions please contact Gerald McDonough on 01-863 5611 Ext 2202

DEVELOPMENT  
System Development  
Project Managers

up to £10,600

Will report directly to the Computer Manager and each will lead a flexible team of up to ten analysts and programmers on major project development. They should have led at least one major project from conception to implementation and will be experienced in systems analysis and design. IBM experience is not essential.

## Senior Systems Analyst

up to £8,300

Should be experienced analysts capable of undertaking analysis and design work on major projects unsupervised.

## Lead Programmers

up to £8,300

Should be experienced programmers capable of leading a team of up to six programmers.

## Senior Analyst Programmers

up to £7,800

Should be experienced COBOL programmers with some analysis experience.

## Analyst Programmers

up to £7,800

Should be programmers with at least two years experience, preferably COBOL, wishing to move over to analysis work.

## Programmers

up to £7,500

Should have at least one year's experience, preferably in COBOL.

OPERATIONS  
Computer Centre Manager

up to £11,200

Responsible to the Computer Manager for all Operations and Systems Programming. Initially, the post holder will review standards and set up the Operations Section on a bureau basis with direct recharging and accountability to users. He/she will have had considerable experience in a similar environment.

## Shift Leaders

up to £7,800

Should be experienced operators now able to lead a shift. Experience in VM, DOS/VSE, and teleprocessing would all be advantageous. The computer operates on a 5 day week — the two shifts covering 7.30 am — 11 pm. The salaries quoted include a generous shift allowance.

## Control Officer

up to £5,800

Responsible for carrying out job set up and control work and would suit a control clerk or computer operator with job control experience.

SYSTEMS  
Systems Programmers

up to £7,800

Responsible for generating, maintaining and developing VM, DOS/VSE, DB/DC and utility programs.

Harrow

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BASIC + PROGRAMMERS  
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## C. London

A software house is currently undergoing a large recruitment campaign due to new products and enhancements on current systems. The minimum requirement is one year's BASIC/BASIC+ within a commercial environment. The rapid expansion of this software house within the last few years is simple proof of excellent career progression within a young and friendly environment. As well as an excellent starting salary (according to age and experience) the client also offers 6 monthly reviews and a car allowance.

JUNIOR PROGRAMMERS £NEG  
All Areas

If you have at least one year's commercial experience in a Mini or Mainframe environment and feel that you are under-utilised or career progression is poor, then do not hesitate to call us. We have many clients looking for Programmers at the Junior level in all areas of London and the Home Counties. Good salaries and perks are varied depending on the job but there are several financial institutions that offer Mortgage Subsidies.

COBOL PROGRAMMERS £6500  
C. London

A large financial organisation is currently seeking Programmers at all levels. The salary indicated is for 2 years' COBOL experience. The present hardware is an ICL 1900 but a 2960 is in the process of being installed; this therefore makes it an exciting time for anyone joining the company at the moment. Although the hardware is ICL, this does NOT exclude applicants with good COBOL on other Mainframes. The company offers free lunches, season ticket loans, annual bonus, flextime and an excellent Mortgage Subsidy.

## IBM OS

Opportunities exist in South London for experienced operators to move all shifts. Salary negotiable around £8000.

## IBM OS OPERATORS

Experienced staff required for 3-shift working in Central and North London. Good technical knowledge of OS/VSE essential.

## IBM OS OPERATORS

Experienced operators required for site in West London to work 3 shifts. Multi machine and hardware environment.

## IBM DOS SHIFT LEADER

An International bank in the City require an experienced Senior Operator or Shift Leader who is conversant with DOS/VSE and POWER/VSE.

## IBM DOS OPERATORS

Vacancies in Central and West London for operators with a minimum of 12-18 months' experience. 2 and 3 shifts available.

## IBM SYSTEM 3 OPERATORS

Site in Central London requires experienced operators to work various shift patterns on all models.

## HONEYWELL OPERATORS

Vacancies exist for operators who have experience of GCOS or OS2000 in and around London.

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Salary negotiable

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## ICL 1900/2903

Two operators with 12 months' experience 3 shifts, limited night work, well-paid overtime, Xmas bonus, Central London.

## ICL GII OPERATORS

12 months' GII experience required for Central London site. 3 shift system, good company benefits. Technical knowledge beneficial.

## ICL GEORGE II SENIOR OPERATORS

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## UNIVAC OPERATORS

Computer installations in London and Essex require Univac operators. 2 shifts, plenty of overtime, excellent pay reviews and benefits.

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Experienced operators required for numerous installations in London areas. Various shift patterns, salary up to £7000 and benefits.

## N.C.R. OPERATORS

2 operators with at least 6 months' Criterion experience required by Central London site. 3-shift system.

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COMPUTER  
OPERATOR

Involved in the Central Computer Services. The duties of the Computer Operator include assisting with the operation of a CDC System 17 Computer and a CDC 1401 terminal, both connected to the University of London Computer Centre. Salary on scale £3542-£4446 (including London allowance). Applications in writing, giving top qualifications and experience to Mrs D. J. Orla, Personnel Officer, Royal Holloway College, University of London, Egham Hill, Egham, Surrey.

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(2981)

Data Processing  
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Bedfordshire

The Company, a forward thinking, multinational manufacturer with its European headquarters in Bedfordshire, seeks a Data Processing Operations Manager.

The successful applicant will control the operations side of the Department, reporting to the Management Services Manager.

The person (male or female), we are looking for is likely to have both good technical EDP experience and management ability and must also be familiar with IBM 370 equipment, using database systems and telecommunications.

The current equipment is IBM 370/138 using OL/I providing rapidly expanding on-line systems as an integral part of the company operations.

Knowledge of software and database administration would be an added advantage.

This position offers a good career platform with opportunities leading to data processing management.

Please apply giving full details of career to date to:  
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## to £8 SYSTEMS PROGRAMMER

A major manufacturing and marketing organisation based in Bracknell is seeking a Systems Programmer with 2 years' DOS/VSE and a solid commercial applications background utilising PL/I or Assembler.

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3031

4341

DOS/VS

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Salary: upwards from £8000

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The post involves shift work, providing coverage from 0700 to 1900 hours. Monday to Friday (2 shift system), for which a shift allowance of 12½% is payable. Applicants should have experience in digital techniques and/or video systems and preferably qualified to ONC/ City and Guilds in Electronics.

Application forms, returnable by 17th March, 1980 from the County Engineer, 4th Floor, Stearns House, Caning Place, Liverpool L1 5JW. (Tel. 051-227 8234, Ext. 2612). Please quote Ref. No. TR/597 in all correspondence.

**Merseyside County Council**

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UNIVERSITY COLLEGE OF LONDON  
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Applications are invited for the post of

**COMPUTER PROGRAMMER**

to join the Planetary Atmosphere Group led by Dr. Barry Hunt, to assist in the development of software for the analysis of imaging observations of planetary atmospheres, which are produced on the group's interactive image processing systems.

The current observations are produced by the Voyager spacecraft and the Mariner 10 and Pioneer 10 and 11 spacecraft. Applications should be sent to Dr. G. H. Jones, Dept. of Physics and Astronomy, University College London, Gower Street, London WC1E 6BT.

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(Computer Division)

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Application forms from A. Ramsay, Operations Manager, Civic Centre, Lampton Road, Houslow TW3 4DN. Tel: 01-570 7728, ext 3125. Closing date: March 14, 1980.

**NORTHERN RECRUITMENT FEATURE**

**MARCH 6th**

FOR FURTHER INFORMATION

Contact: OWEN KELLY on 061-872 4211

## Midlands

### PROGRAMMERS/ANALYSTS to £7,000

This Midlands based manufacturing company, leaders in their field currently seeks applicants with a minimum of 2 years' COBOL experience. They retain ICL 1900 with an update on order and offer TRAINING on systems and on-line applications together with attractive large company benefits.

### PROGRAMMER to £7,500

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### SYSTEMS ANALYSTS to £8,500

Birmingham based organisation retaining Burroughs hardware are currently reviewing the corporate use of their systems and consequently seek an additional analyst to assist on development and redesign. Excellent perks include PROFIT SHARE and subsidised mortgage after statutory period.

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**£5,500 PROGRAMMERS**  
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18 months+ PL/1/IBM 370

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**£6,300+ SYSTEMS ANALYSTS**  
Minimum 3 years' exp. Commercial applications exp.

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ICL 2960/COBOL, Systems Design exp.

**£6,500+ ANALYST/PROGRAMMERS**  
IBM 370/COBOL, Minimum 2 years' exp

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UNIVAC/COBOL, 2½ years+  
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**£5,500+ ANALYST PROGRAMMERS**  
Exp on ICL 1900/COBOL, essential.

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We should like to hear from qualified engineers, male or female, living within commuting distance of London who have experience of servicing equipment associated with computer terminals. Familiarity with logic circuitry is essential.

Salary is negotiable and a car is provided. Benefits include five weeks' holiday.

Please telephone 01-363 1080, Ext. 7, or write to:

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If you have a strong Cobol background together with analysis and design skills then our client can offer you the opportunity to take an important career step and join a technically advanced systems and programming installation.

Our client is developing Sales, Manufacturing and Financial applications using an IBM mainframe and a network of mini computers which provide database and real-time processing capabilities.

You will be responsible for leading a team of programmers and co-ordinating the technical design and programming for an important area of this integrated systems development. Experience of database and real-time systems will be valuable but is not essential as training will be provided.

The benefits package offered in addition to the attractive salary will include twenty-five days' holiday, free BUPA, a subsidised restaurant facility and flexible working.

REF. NW2/2802

### SOFTWARE PROGRAMMING WITH A DIFFERENCE

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**PL/1**  
To improve program efficiency, these programmers will need a strong PL/1 knowledge coupled with an inquiring mind. The installation is a large IBM 3032 machine running under MVS and software enhancements are made via on-line terminals.

**CDC**  
These programmers will require extensive Assembler and operating system experience gained on CDC equipment in order to implement enhancements, modifications, additions and updates to the CDC/NOS system.

**RSK-11**  
Programmers with extensive experience of MACROS-11 programming and the RSK-11 operating system are required for work in a variety of defence applications.

REF. 82/2802

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Guardian Computer Services is a software house employing over 35 people, developing tailor-made, commercial, on-line systems in a project environment on the following hardware.

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In order to continue our expansion we need

**SYSTEMS ANALYSTS**  
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If you have a minimum of 12 months' experience of any of the languages listed we will be pleased to re-train you on the applicable hardware should this be necessary. We can also offer you the chance to further widen your experience with a company where ability is quickly recognised and rewarded by both remuneration and promotion to Project Leadership and Project Management positions in the first-time user environment.

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**STARTING SALARY** from c. £4000 to c. £7000, REVIEWED AFTER SIX MONTHS  
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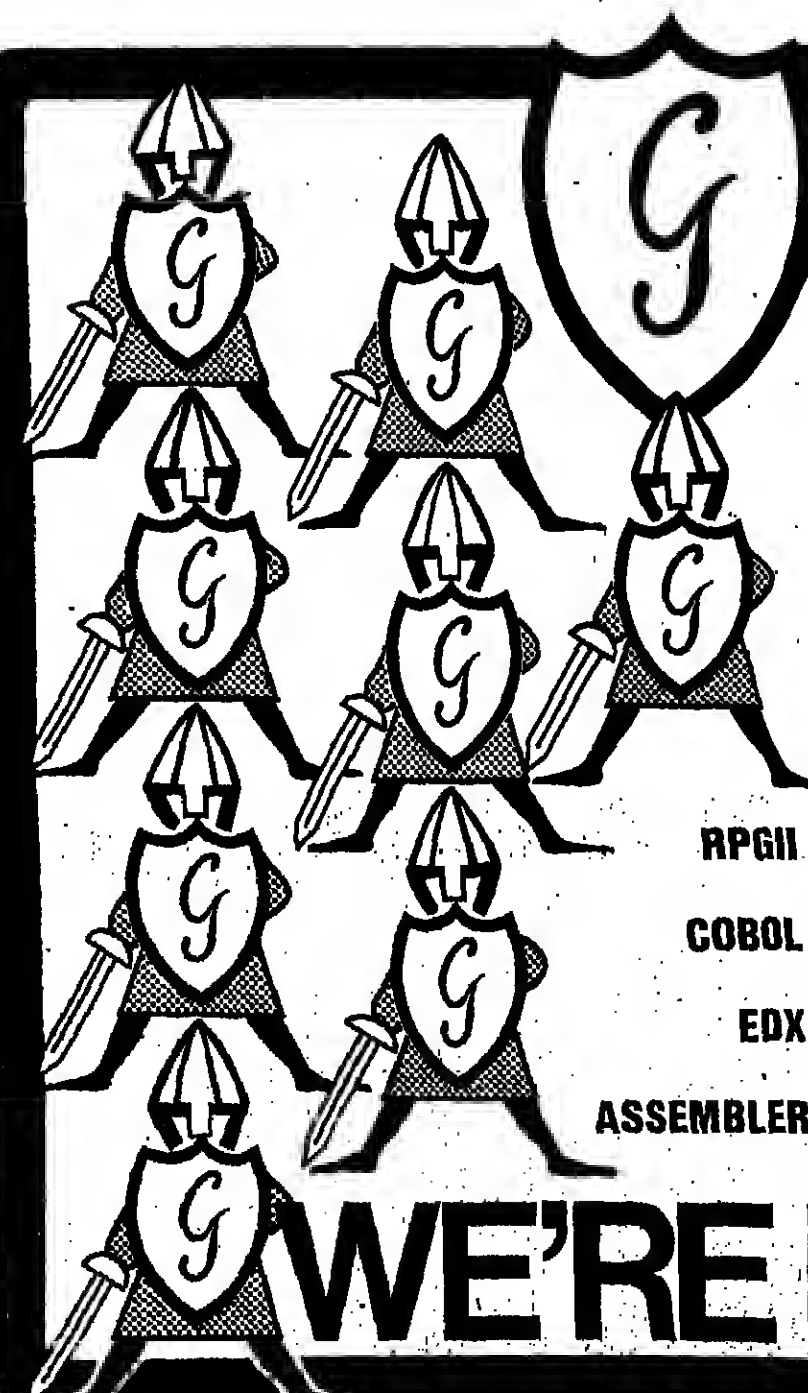
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If you wish to develop your career and obtain genuine job satisfaction with one of the North's most successful software houses, in either Manchester or Leeds, please write or phone KEN MCENTYRE.

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TELEPHONE 081-737 7352

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**MULTIPLE MINI-COMPUTER NETWORKS**

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A world of modern computer technology and technique... all under a single roof. That's what Data Logic can offer you as an ambitious and independently-minded analyst or programmer with high level language or assembler experience.

Our job - as one of the UK's largest software houses - is to design and build systems unique to the needs of each customer. Our strength lies especially in large-scale, multi-site or multi-processor configurations which call for a combination of very advanced expertise and experience. The beauty of the business is that we're free from the constraints imposed by economy or practicality on the average user company. We can work with the widest selection of hardware - minis, micros and mainframes. We can apply and adapt the full range of current techniques and even invent our own if nothing in evidence quite fits the bill. Our professionalism, innovation and versatility has brought us the respect - and the business - of every sector of industry and commerce.

**Senior Systems Staff**  
(up to £9000 pa + car or car allowance)

Should have at least 5 years' relevant experience including some work in consultancy, systems design or team management. You should have substantial knowledge either of high-level language implementation on a leading mainframe, or assembler language development on DEC, Data General or other leading minicomputers. Ref: DB1/CW.

**Programmers and Analyst/Programmers** (up to £6500 pa)

Should have at least 2 years' experience in a high-level language or assembler on any leading mainframe or mini. You'll work on projects as varied as database and distributed systems, data communications, telemetry and operating systems. Each will be planned to build on your existing experience and lead you towards career development into either management or senior specialist roles with a company that is backed by one of the world's biggest electronics and systems group, Raytheon. Ref: DB1/CW.

Your base location will be Soho Square, Greenford (Middlesex), the Midlands or the North but frequently an assignment you will work in a project team at the customer's premises. Prospects are excellent. Data Logic has a wider business base and is growing faster than most of the industry, it is part of the giant International Raytheon group and those who join can look forward to a secure and challenging long-term future.

Please write with full career details, or phone for an application form, to: Barbara Hawkins, Personnel Department, Data Logic Limited, 26 High Street, Chesham, Bucks. Tel: Chesham (0294 05) 7111.

**Data Logic**  
A Raytheon Company

## Systems Programmers

Here at Burroughs Machines, Croydon, we are developing and implementing our next generation of micro-computer based terminals. To continue our lead in this field we need additional Programmers who are looking to apply their individual skills to the design and development of complete systems.

Our programmers are involved at all stages of a product, from initial concept through design and development into production. The systems programmers we are seeking will come from all areas. Our requirements spread across every level: from programmers with a world of experience looking for a new challenge, to recent graduates looking to develop a successful career in an expanding environment.

Involvement will cover a number of areas including Interactive Systems, Interpreters, User Interfaces and Hardware Diagnostic Test Routines. Previous experience in these areas would be an advantage but is not essential - enthusiasm and the ability to tackle a new challenge are more important.

You will be based at our Croydon Centre, although some travel will be necessary for you to fulfil your job responsibilities. Excellent opportunities exist for career development, both in the U.K. and overseas.

Salary will relate to individual experience and circumstances but will not be a limiting factor. Relocation assistance will be given where necessary.

For further details please contact:

Roddy Macdonald or  
Emad Al-Kulmichi,  
Burroughs Machines Ltd.,  
512, Purley Way, Croydon,  
Surrey, CR0 4NZ.  
Tel: 01-898 0355. Ext. 228 and 280.

**Burroughs**

Are you interested in contributing your ideas and specialist software expertise to new generations of communications technology? At our Portsmouth Applied Electronics Laboratories we're building the nucleus of a new multi-discipline team of engineers to work on the communications concepts of tomorrow.

That means outstanding opportunities for career development and the chance to work with the very latest ideas in mini and micro based systems. Opportunities exist in the areas of Systems Engineering, Systems Software, Systems Architecture, Software Assurance, Equipment Technology.

To join us you should be qualified to Degree level and have a minimum of 2 years' experience of real-time software development, plus extensive knowledge of interfacing with mini and micro systems hardware. You'll find our working conditions and facilities are excellent, and for men and women with the right kind of ability and creative talent, salary should present no obstacle. In addition, every assistance will be given with relocation where applicable.

Please write with personal and career details, or telephone for an application form, quoting reference BL39 to: Jack Burnie, Marconi Space and Defence Systems Limited, Applied Electronics Laboratories, The Airport, Portsmouth, Hants. Telephone: Portsmouth (0705) 699414.

**Marconi Space & Defence Systems (Portsmouth)**  
A GEC-Marconi Electronics Company

**NORTHERN RECRUITMENT FEATURE**

**MARCH 6th**

**FOR FURTHER INFORMATION**

Contact: OWEN KELLY on 061-872 4211

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**SALARY NEGOTIABLE PLUS CAR**

This is an excellent opportunity for a person aged 25-35 with a small team and involved from "GRASS ROOTS" of installation, mini computer to programming. It you have COBOL or basic language experience you should have called yesterday!

on 408 2022

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16 Barkley Way  
London W1

**BOX Nos.**

Box number replies should be addressed to:

**Box No. ....**  
c/o Computer Weekly  
Dorset House  
Stamford Street  
London SE1 9LU

## BOURNEMOUTH SYSTEMS ANALYST

NCR CRITERION B550

The company currently has an NCR Criterion B550 Computer with 256K memory operating on both batch and On-Line applications.

We require a Systems Analyst aged 27/40 to join our progressive team, ideally with previous experience of NCR hardware and software. Experience in another discipline (e.g. Engineering or Accountancy) prior to moving into Data Processing would be an advantage.

This position requires an individual with the personality to communicate effectively with user departments to management level, and who can play a vital role in maintaining systems standards and controlling Project Implementation.

Please write giving brief relevant details to:

Manager - Personnel Services  
THE DEVILISS COMPANY LIMITED  
Ringwood Rd, Bournemouth BH11 9LH

## COMPUTER FIELD SERVICE

We are a rapidly growing company and wish to recruit the following staff:

**1) UK FIELD SERVICE MANAGER**

CIRCA £9,800

The successful applicant is likely to possess considerable field service experience and be capable of leading/motivating a team of field service engineers situated throughout the UK. This position is likely to suit a person who has already entered Management grade and now wishes to fulfil his potential in a rapidly expanding environment.

**2) SENIOR TECHNICAL SUPPORT ENGINEERS**

CIRCA £5,000

Applicants should possess considerable experience in Computer Field Service. Experience with mini-computers in a technical support capacity would be a distinct advantage. Extensive travel throughout Europe is envisaged.

We would also be interested in hearing from Engineers (qualified as above) with a strong communications background.

Please write to Box No. 1080, Computer Weekly

**UNIVERSITY OF GLASGOW LECTURESHIP IN COMPUTING SCIENCE**

Applications are invited for a post of Lecturer in the Department of Computing Science, tenable from 1st October, 1980. Salary will be within the range £5052-£7410 of the Lecturers scale £5052-£10,484 (under review), with placement according to age, qualifications and experience.

Further particulars may be obtained from the Secretary of the University Court (Room 18), University of Glasgow, Glasgow G12 8QQ, to whom applications should be sent, giving the name and address of three referees, should be sent not later than 31st March, 1980.

Simply please quote Ref. No. 4990c

## CONFIDENTIAL BOX NUMBER SERVICE

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READERS who do not wish their replies to be forwarded to a particular company or individual should enclose their letter in a sealed envelope, addressed to the Box Number Manager, Computer Weekly, Dorset House, Stamford Street, London SE1 9LU.

Letters not forwarded will be destroyed and no correspondence can be entered into.

## CLASSIFIED COPY

All classified copy should reach our offices no later than 3.30 p.m. on the Monday preceding Thursday's publication.

If complete artwork is supplied, 11 a.m. on Tuesday.

Ring Ray Kelly for further details on 01-261 8018.

**COMPUTER WEEKLY CLASSIFIED**

**01 261 8028/8097/8018**

the newspaper computer people rely on

**UNIVERSITY OF SALFORD**  
**PROGRAMMER**  
(Salary up to £8067 p.a.)

Required in the Registrar's Department to Administer the Computer Section which has an ICL 2804-50 Computer with 48K words of store and on-line facilities.

Applicants should be experienced Programmers with a background of writing COBOL and/or PL/I/AS programs. Practical experience of ICL 2803/4 software and on-line programming would be advantageous.

Telephone B. C. Thompson (Manager, Staff Services Office) on 061-733 5843 Ext. 717 for further information or apply in writing to The Registrar, University of Salford, Salford M6 4WT, giving details of your salary, age, education and experience by 7 March 1980, quoting reference number A/664/CW.

## BOX Nos.

Box number replies should be addressed to:

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Dorset House  
Stamford Street  
London SE1 9LU

## Excellent Contract Opportunities

In line with our rapid growth rate we have a continuous requirement for skilled and dedicated professional contract staff.

**MARK IV Analyst/Programmers**  
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**Assembler CICS or VTAM expert, Essex**

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**Systems 34 Analysts Programmers**  
**City**

**UNIVAC DMS Analyst/Programmers**  
**Essex**

**RPG Senior Programmers**  
**Essex**



For more information telephone:

Alan King  
Talent Computer Services  
4 Eastern Road  
Romford, Essex  
Tel: Romford 44181/2 28238

## UNIVERSITY OF LONDON COMPUTER CENTRE

Communications Network Support

The University of London Computer Centre has a vacancy in the Network Support Section of the Operations Group. The recruit will join a small group responsible for the day-to-day support of the Centre's extensive and expanding data communications network. The work is varied and involves the analysis and rectification of technical and operational problems, also liaison with users, staff and suppliers.

Two shift working is required involving morning and limited evening shifts for which an allowance is paid. Applicants should have a minimum of B.O. levels, possession of A-levels would be an advantage. Knowledge of electronic workshop practice and/or assembly would be a definite advantage.

Starting salary within the range of £5881-£4876 p.a. (inc. depending on age and experience). Application giving age, qualifications and previous employment to: Mr R. M. BLACK, UNIVERSITY OF LONDON, COMPUTER CENTRE, 20 GUILDFOUR STREET, LONDON, W.C.1. Tel. 01-405 8400.

## THE SALES BIT

## More tips on starting at the top

LAST week I wrote about the reluctance of many salesmen, particularly the young and relatively inexperienced, to make their first approach at managing director level. While almost every salesman will acknowledge the benefits of contact at the very top of a client company, many are in awe of the status and authority of the chief executive. They take the softer approach at middle management level, in the firm belief that it will be easier to sell, whereas it usually results in more hassles and fewer decisions than would otherwise be experienced.

Of course, many salesmen would not dream of making their first sales approach at any level other than with the MD. Unfortunately a considerable proportion then proceed to throw away this benefit by putting entirely the wrong emphasis on the subsequent dialogue. As a general rule, managing directors are primarily interested in financial benefits, whereas middle management wants to know about performance and technical efficiency. Take for example the sale of a computer system for stock control. The warehouse manager will have a real influence on the final decision. He will be extremely interested in the equipment's efficiency in space utilisation, ease of use, industry compatible language processors, standard applications packages, disc access times, printing speeds and so on. On the other hand, the managing director's interest in such aspects of product selection will be virtually academic so long as middle management has no extreme objections. He

wants to hear about savings related to future benefits which can bring about increased company growth and/or profitability.

An approach to him might be made along these lines:

"This system, which is already enjoying considerable success with many other companies in the same line of business as yourself, will not only bring about a significant reduction in your total stockholding - don't ever quote anticipated savings or improvements in percentage terms! - but also enable you considerably to reduce out-of-date stock, over-ordering and 'stock-outs', thus providing a higher level of customer service."

This means you will be able both to reduce capital investment in live and redundant stock and increase revenues by virtue of a more reliable stock availability for customers who might otherwise go to your competitors. This will make a considerable contribution to the profitability of your company and provide you with management aids already being enjoyed by many of your competitors."

Managing directors want to know about ways in which they can improve total company performance. This usually brings about a relative lack of interest in aesthetics, mechanics and the ambitions of divisional or departmental managers and concentration on those factors related to the company's, and therefore their own, survival.

More next week.

TRADER

## ON THE MOVE

### Gone to Brum

Microcomputer software designers and consultants Tridiana Micro Ltd have moved from Rushden, Northants, to new offices at Smithfield House, Digbeth, Birmingham, B5 8BS. Tel: 021-622 1754 and 609676.

### Showrooms

THREE new showrooms will be opened by the Carter-Parratt Group in March and April. They are located at: Capalt Burn, Perth Road, Ounbline; Perth Road, Ounbline; Perth Road, Ounbline. Tel: 0784 322848; Northants, Crown House, Armley Road, Leeds LS12 2EJ. Tel: 0532 448861; South West, 1 Beaufort Place, Larkhall, Bath, Avon, BA1 8RP. Tel: 0226 331841.

proceeding systems is being brought into the West End in March. The address will be Calton House, George Street, W1. Wang has also completed the moving of its Northern branch to Regent House, Heaton Lane, Stockport and its Midlands office to Elmton House, Coventry Road, Birmingham 26. The UK headquarters remain at Lower Richmond Road, Richmond, Surrey. Tel: 01-878 7821.

### Bigger premises

MEMOREX UK has relocated its Bradford office to larger premises at 13 Springbank Place, Bradford (0274) 491211. Sales inquiries for the district will continue to be dealt with by the Altrincham office.

### Wang changes

Wang's sales and training operation for Wang's computers and word processing systems is being brought into the West End in March. The address will be Calton House, George Street, W1. Wang has also completed the moving of its Northern branch to Regent House, Heaton Lane, Stockport and its Midlands office to Elmton House, Coventry Road, Birmingham 26. The UK headquarters remain at Lower Richmond Road, Richmond, Surrey. Tel: 01-878 7821.

### Puzzle Answer

704843  
832498  
283443  
381444  
704845

### 370 for sale

The IBM 370/158 computer, model 440, of Wallington, Surrey, will shortly be moving to new premises at 52-54 Stafford Road, Wallington. The company's IBM 370/158, now replaced by an IBM 4331, is for sale.

### New York

MOVING into new offices in New York, the US operations division of Artek Systems is now at 7 Huppert Square in New York's Lower Manhattan.

best of the

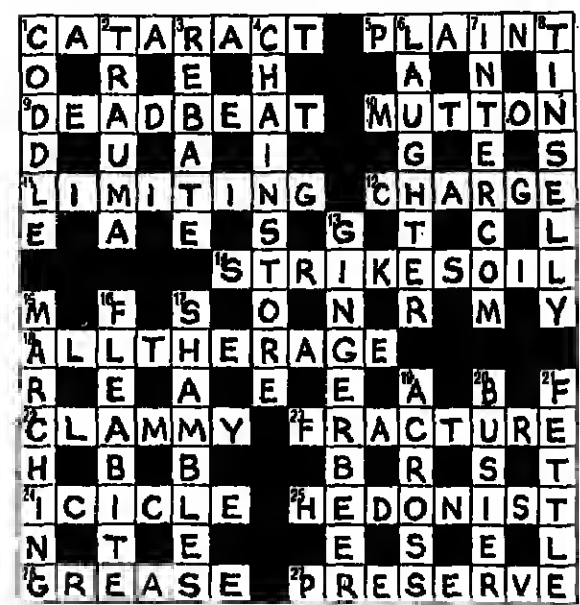


## CW Prize Crossword No 2

## SOLUTION

THE winner of Computer Weekly Prize Crossword No 2 is Chris Dennis, a programmer with Ferranti Computer Systems at Bracknell, Berks. He will receive the first prize of £10. The second prizes of £5 each go to Rod Williams, senior computing officer at the Computer Centre, Strathclyde University, Glasgow, and Philip Franklin, programming manager with Fernot, the software house and consultancy of Croydon.

Prize Crossword No 3 will appear on March 6



## NEW ZEALAND COMPUTER STAFF

The Computer Services Division of the New Zealand State Services Commission has the following vacancies for EOP staff in the middle and upper staff echelons. There are openings in all fields of EOP for qualified people, including those experienced in development or operations in major systems, large scale equipment, and data communications systems.

EDP Consultants	up to NZ\$20,000
Senior Systems Analyst or Analysts	up to NZ\$17,000
Systems Programmers	up to NZ\$17,000
Senior Programmers with specialist skills in Training or Quality Control	up to NZ\$15,000
Data Administrators	up to NZ\$19,000
Shift Supervisors	up to NZ\$13,000
Senior Operators	up to NZ\$13,300
Programmer/Analyst	up to NZ\$14,000

The Division handles work for some forty User Government Departments and has six operational centres, as well as 'in house' equipment servicing the Users. Each Centre has extensive network providing 'on-line' interactive and 'batch' facilities for a range of commercial, scientific and engineering users.

Distributed processing is being used in practical operational situation and considerable growth in this area is anticipated.

Mainframes servicing these applications include Burroughs, Digital, I.B.M., I.C.L., Univac, etc. Software is in line with the requirements and also includes packages such as G.I.S., STARS, M.A.S., M.M.S., I.M.S., D.M.S. 11, I.D.M.S. and D.M.S. 1100. Mini-computer and micro computer projects are becoming more prevalent. Latest technologies and methodologies are used and work is project oriented to ensure job satisfaction and a sense of achievement.

The Division places great emphasis on training and opportunities exist for individual advancement.

Location will be Wellington, Taranaki (near Whangarei) and Wanganui.

Financial assistance will be available to move family and household effects to New Zealand.

Applicants must be able to meet the New Zealand immigration criteria.

For further information write immediately to

EDP Recruitment  
c/o Chief Migration Officer  
New Zealand High Commission  
New Zealand House  
Haymarket  
LONDON SW1Y 4TG

young age, family details and resume of qualifications and experience

It is expected interviews will take place in London in the near future.

## ilea

INNER LONDON  
EDUCATION AUTHORITY

## Inspector for Computer Education

Salary Range: £10,799 - £11,858  
(inclusive of London weighting)

Applications are invited for the post of Inspector. The main but not exclusive responsibility will be the development of computer education in primary and secondary schools. There will be particular emphasis on the growth of the use of microcomputers across the curriculum and related in-service training. Applicants should have had substantial experience in these areas and will be expected to assist the staff inspector for computer education on all aspects of the work.

Application forms and further details may be obtained from the Education Officer (EO/Exam B), Room 307, The County Hall, London SE1 7PS (Please enclose a stamped addressed envelope). Completed forms to be returned by 13 March 1980.



## SYSTEMS ANALYST

c. £7,000

E. Gomme Limited, manufacturers of G-Plan furniture at three locations in the United Kingdom, require a Systems Analyst to join the small friendly data processing team at the High Wycombe headquarters, where we use an IBM 370/126 to process a wide range of applications.

Applicants should ideally be aged between 25 and 35, with a programming background and two years' systems experience. We can offer you an important role in the design, implementation and maintenance of a wide variety of both batch and T.P. applications.

The Company offers excellent conditions of service and a salary will be negotiable in the region of £7,000. Generous assistance with relocation expenses will be given, where appropriate.

Write to:

A. Sampson  
Company Personnel Manager  
E. Gomme Limited  
Spring Gardens, High Wycombe, Bucks.

## CONTRACT VACANCIES IN THE MIDLANDS AND SOUTH FREELANCE PROGRAMMERS & ANALYSTS

COMPETITIVE RATES INTERESTING ASSIGNMENTS  
REGISTER NOW WITH THE SPECIALISTS  
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PROJECT RECRUITMENT LIMITED  
First Floor, Scale House, Holloway Circus  
Stroudgates, 51 TEG. Licence No. 0087  
A member of the Civil Computer Systems Group

## Sex Discrimination Act

No job advertisement which indicates or can reasonably be understood as indicating an intention to discriminate on grounds of sex (e.g. by inviting applications only from males or only from females) may be accepted unless:

- (1) the job is for the purpose of a private household or
- (2) it is in a business employing less than six persons or
- (3) it is otherwise excepted from the requirements of the Sex Discrimination Act.

A statement must be made at the time the advertisement is placed saying which of the exceptions in the Act is considered to apply.



## Computer Programmer

Rotterdam

c.£10,000 p.a. + benefits

Seatrain Europe B.V., a division of one of the world's most rapidly expanding Container Lines, has a vacancy for a Computer Programmer to be based at its European Headquarters in Rotterdam.

This is a new position and the person appointed will be required to write and implement programmes for use in Seatrain's European shipping activities. The Company currently has 1.6 M. S/34s located in Holland, Germany, Sweden, U.K. and France, and a certain amount of European travel will be involved. Applicants should have gained a minimum of 2 years experience using RPG II, preferably with the above hardware.

This position offers an attractive salary, excellent conditions of employment and assistance with relocation to Holland. To apply, please write giving brief details of age, education, job history and current salary to:—

Mr. M. Thompson  
Personnel Director—Europe  
c/o 1a Bow Lane  
London EC4M 9EJ

Interviews will be held in London.

## Computing in Oxfordshire

We are looking for enthusiastic physicists or computer scientists to join the Data Handling Group of the Laboratories' High Energy Physics Division. Members of the group are working on all aspects of the computing required for research in elementary particle physics, both at the Laboratory and at international research centres in Geneva and Hamburg. Projects involve collaboration with University groups and some overseas travel. Currently we are involved in:

- (i) Real-time programming for data acquisition and control using the DEC VAX-11/780, GEC 4080, etc.
- (ii) Data reduction and analysis in the Laboratory's IBM 3032 + 380/158 complex.
- (iii) Software development for Laboratory designed fast trigger processors.
- (iv) Development of an interactive graphics system.

Successful applicants would work in one or more of these areas. Candidates should have a good honours degree in physics, computer science or a related subject. Depending on qualifications and experience, salaries will be within the following scales:

Scientific Officer £4,310-£5,485  
Higher Scientific Officer £5,097-£6,737

Non-contributory superannuation scheme.

If you are interested, please ring Jane Williams of the Personnel Group on Abingdon 21900 ext. 510 or write to her quoting reference VN 886 at:

The Rutherford and Appleton Laboratories,  
Chilton, Didcot, Oxon OX11 0QX.

Closing date: 14th March, 1980.

Rutherford and Appleton Laboratories

## UNIVERSITY OF LIVERPOOL DEPARTMENT OF PHYSICS EXPERIMENTAL OR SENIOR EXPERIMENTAL OFFICER

1. A young physicist to assist academic staff with processing and analysing Nuclear Physics data. A degree in Physics and some knowledge of Fortran is essential.
2. A Programmer/Systems Analyst to assist with the exploitation of a multi-user workstation, based on coupled G.E.C. 4086 computers, which has access to the S.R.C.'s large installations at the Rutherford and Daresbury Laboratories. A degree or equivalent is essential.

Salaries according to age and experience on the scale for Experimental Officers (£4165-£6981 p.a.) or Senior Experimental Officers (£4786-£7273 p.a.).  
Application forms may be obtained from The Registrar, The University, P.O. Box 147, Liverpool L69 3BX. Quoted ref. 859/CW.



Immediate Contract Vacancies  
SYSTEMS ANALYSTS  
PROGRAMMERS  
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Excellent Rates, Long and Secure Positions  
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## LONDON COMMUTING AREA

Programmers	DOS/VS	CICS/VS	COBOL	£340 p.w.
Programmers	OS/VS1	PL/1	JACKSON	£320 p.w.
Programmers	OS/VS1	CICS/VS	PL/1	£350 p.w.
Programmers	IBM	COBOL		£280-300 p.w.
Programmers	DOS/VS	CICS/VS	COBOL BAL	£350 p.w.
Analyst/Programmer	OS/VS1	COBOL	EASYTRIEVE	£330 p.w.
System Programmer	OS/VS	VTAM	CICS/VS	£425 p.w.
Team Leader	DOS/VS	PL/1	BAL	£360 p.w.

Telephone Richard Morley on:-

(01) 638-0036

DILOG LIMITED Throgmorton House 15 Cophall Avenue London EC2M 5TP

professionals seeking professionals

## FORTRAN PROGRAMMERS

Experienced FORTRAN programmers are required for the Geophysicists' Department of a multi-national airborne survey company. The successful candidates will work with a team of geophysicists and geologists who are developing computer programs for use in mineral exploration. The company operates advanced computing equipment. Applicants must possess scientific programming experience in industry. Experience in the geophysics' industry would be helpful but is not essential. A competitive salary will be offered.

Replies should be addressed to The Chief Geophysicist, Geosurvey International Limited, Geosurvey House, Orchard Lane, East Molesey, Surrey KT8 0BY.

Geosurvey International

## TRANS JOINT COMPUTER COMMITTEE DEPUTY COMPUTER MANAGER

P.O.1 (3-7) £5627-£7329 p.a.  
(Competability Award pending)

The position, situated in Trans on the delightful Kent coast, provides a fast growing service to the Thanet and Dover District Councils and is supported with a Honeywell 627-50 with 256K memory, 68K disks and a magnetic tape. Input is via key-to-diskette.

A person with proven experience of systems development and staff supervision, preferably in local government, is now sought. Duties include leading and organising a development staff of four to cover the maintenance of existing systems, the design and implementation of new systems involving communications and the supervision of the computer centre in the absence of the computer manager.

The person appointed will be expected to have formal systems training and knowledge of COBOL and be a significant influence in the substantial changes required by the Council's authorities.

## University of Bristol

### Teaching Assistant in Computer Science

The Department of Computer Science is currently increasing its use of microprocessor systems in both teaching and research. It provides undergraduate courses in hardware logic design, microprocessor architecture and microprocessor software. This post will be principally concerned with laboratory teaching and advisory work for students taking these courses. There will also be opportunities to use a large on-line computer system to assist academic staff in the development of non-numerical software for other courses. Candidates should have HND or graduate qualifications and previous programming experience.

The salary for the appointment will be £4,402-£8,989 p.a. or £5,062-£7,410 p.a. (from 1st April 1980); the initial placement depending on age, qualification and experience. Applicants with a relevant Ph.D. can expect to be appointed on the higher scale.

Further particulars may be obtained from the Registrar and Secretary, University of Bristol, Bristol BS8 1TH, to whom applications should be sent by March 28th 1980. Please quote reference 85.

## NATURAL ENVIRONMENT RESEARCH COUNCIL

NERC is a government funded body responsible for research in the environmental sciences. Its scientific support services include a Computing Service capability catering for provision and development of computing facilities at NERC Institutes and Units throughout the UK.

## GROUP LEADERS— NERC COMPUTING SERVICE

### Local Support Group, Senior Scientific Officer/ Principal Scientific Officer

You should have wide experience of scientific computing and an interest in environmental sciences. Your group will be responsible for efficient management of programming staff throughout the U.K. According to experience and qualifications offered the appointment will be at SSO or PSO level (see below) and located either at Bilton (Mk) or Chilton (Oxfordshire).

Further information about the nature of the work and responsibilities involved may be obtained from Mr. B. J. Hinde on (061) 653 8633.

Further information about the nature of the work and responsibilities involved may be obtained from Dr. A. J. R. Voss on (061) 653 8633.

Candidates should normally have an honours degree in a science, maths or engineering discipline and at least four years' postgraduate or other proven experience.

Salaries are:

### Senior Scientific Officer

£8,332-£8,706

22 days' paid leave plus 10% days' public holiday

### Principal Scientific Officer

£8,813-£11,343

26 days' paid leave plus 10% days' public holiday

Benefits include a non-contributory superannuation scheme. Conditions of employment are similar to those of the Civil Service, though NERC is not a Government Department. Applications, stating which Group Leader post you are applying for, should be returned by 15 March, 1980, to the personnel officer, Mr. B. J. Hinde, NERC Computing Service, Natural Environment Research Council, Chilton House, North Star Avenue, Swindon, Wiltshire SN2 1EU. Tel. (0793) 40101. Extn. 431.